

Rocky Flats Independent Verification

Sampling and Survey Report

**Evaluation and Interpretation of the Residual
Radiological Surface Contamination Sampling Results**

**Buildings 727, 782, and 783
Survey Units 727-01, 727-02, 782-01, and 782-02**

Volume I

March 2000

Work Performed Under DOE Contract No. DE-AC13-96GJ87335

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Signature Page

Prepared by

Art Samiljan
Staff Health Physicist

Date

Approved by

Steve Rima
Project, Technical Manager

Date

Approved for
Release by

Michael Butherus
Manager, Major Projects

Date

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Acronyms and Abbreviations

Am-241	americium-241
CCV	continuing calibration verification
CDPHE	Colorado Department of Public Health and Environment
CLP	Contract Laboratory Program
cpm	counts per minute
cm ²	square centimeter(s)
D&D	decontamination and decommissioning
DCGL	derived concentration guideline level
DCGL _{EMC}	derived concentration guideline level-elevated measurement comparison
DCGL _{LW}	derived concentration guideline level-average concentration
DOE	U.S. Department of Energy
dpm	disintegration(s) per minute
DQA	data quality analysis
DQI	data quality indicator
DQO	data quality objective
EPA	U.S. Environmental Protection Agency
GJO	Grand Junction Office
IV	independent verification
IVC	independent verification contractor
IVP	independent verification program
LCS	laboratory control sample
MARSSIM	Multi-Agency Radiation Survey and Site Investigation Manual
MDA	minimum detectable activity
mm	millimeter(s)
m ²	square meter(s)
NIST	National Institute of Standards and Technology
PB	preparation blank
pCi	picoCurie(s)
Pu-238	plutonium-238
Pu-239	plutonium-239
Pu-240	plutonium-240
QA	quality assurance
QC	quality control
RFETS	Rocky Flats Environmental Technology Site
RFFO	Rocky Flats Field Office
RMRS	Rocky Mountain Remediation Services
SAP	Sampling and Analysis Plan
U	uranium
UCL ₉₅	95 percent upper confidence limit

1.0 Introduction

1.1 Background

This sampling and survey report evaluates the final status survey data collected in Buildings 727, 782, and 783, both by the Rocky Flats Environmental Technology Site's (RFETS) Contractors (Kaiser-Hill, Rocky Mountain Remediation Services, L.L.C., and their subcontractors, hereafter referred to as the Contractor) and by MACTEC-ERS, the independent verification contractor (IVC). Data collected by the IVC is designed to independently assess and verify the RFETS' compliance with the approved derived concentration guideline levels (DCGL) established for the buildings in the 779 Cluster. Data collected by the Contractor has been reviewed by the IVC and compared with the independent verification data collected by the IVC.

The sampling and survey data collected has been compared with the approved surface contamination concentration benchmark values known as DCGLs. The RFETS DCGLs for surface contamination concentration are specified in the Contractor's *Closeout Radiological Survey Plan for the 779 Cluster* (RMRS 1999a). The independent verification DCGLs are specified in the IVC's *Independent Verification Sampling and Analysis Plan for Building 779 Cluster* (DOE 1999a).

Samples collected and surveys performed to obtain independent verification and corroboration of the RFETS sampling and survey results were collected in accordance with the U.S. Environmental Protection Agency (EPA), Colorado Department of Public Health and Environment (CDPHE), and U.S. Department of Energy (DOE) approved *Independent Verification Sampling and Analysis Plan for Building 779 Cluster* (IV SAP) (DOE 1999a). The data is evaluated herein principally on the Multi-Agency Radiation Survey and Site Investigation Manual (MARSSIM) data quality assessment methods, conventional guidance from EPA, and accepted practice and methods used in radiological site assessment and characterization. Principal guidance documents include:

- *Multi-Agency Radiation Survey and Site Investigation Manual* (EPA 1997)
- *Data Quality Objectives Process for Superfund* (EPA 1993)
- *Guidance for Data Quality Assessment—Practical Methods for Data Analysis* (EPA 1998)
- *Manual for Conducting Radiological Surveys in Support of License Termination* (NRC 1992)
- *A Nonparametric Statistical Methodology for the Design and Analysis of Final Status Decommissioning Surveys* (NRC 1995)

A common theme in these guidance sources is the use of a seven-step data quality objective (DQO) activity as the foundation for the SAP development and subsequent data evaluation.

Following this introductory background is a discussion of Buildings 727, 782, and 783 histories and an overview of the assessment and independent verification process used. Section 2 describes the field methods and procedures used to collect data. Section 3 presents the sampling results and summary statistics for each subset of data. It also describes the data reduction process

used and statistical comparisons of the data subsets and their significance. Section 4 presents the sampling results in the context of compliance with the benchmark values while Section 5 presents the survey and sampling results in a graphic format. Evaluation of the Contractor's Final Status Radiological Survey, computations, and conclusions are presented in Section 6. The IVC collected data are compared to their respective DQOs in what is termed the Data Quality Analysis in Section 7. Section 8 summarizes the data quality analysis, provides objective assessment of the concentrations of residual contamination found in the buildings, and offers conclusions and recommendations for disposition of the buildings. Appendices are included to provide additional detail where appropriate.

The risk manager and decision maker for this project is DOE-Rocky Flats Field Office (DOE-RFFO).

1.2 History

The Building 779 Cluster is located on DOE's Rocky Flats site near Golden, Colorado. The site is a former nuclear weapons production facility. The various process facilities and laboratories were grouped together with their various support buildings and structures and identified as "clusters," with the building number of the principal building as the cluster name (e.g., the Building 779 Cluster). The 779 Cluster was primarily used for research and development activities and supported a number of various operations as part of the research and development mission including: 1) process chemistry technology, 2) physical metallurgy, 3) machining and gauging, 4) joining technology, and 5) hydriding operations. No processes or operations are now active.

1.2.1 Building 727

Building 727 is a single story structure constructed in 1973 that housed the emergency diesel generator in support of Building 782. The walls are cinderblock and the roof is fiberboard and tar with ballast material supported by beams.

1.2.2 Building 782

Building 782 is a single story structure constructed in 1973 that served as the second plenum building for Building 779. The walls are prefabricated concrete panels and concrete support columns. The roof is fiberboard and tar with ballast material supported by Tee beams.

1.2.3 Building 783

Building 783 is a single story structure constructed in 1973 that housed the motor control centers for the Building 779 cooling towers and circulating pumps as well as the circulating pumps themselves. The walls and roof are galvanized steel.

1.3 Current Condition of Buildings 727, 782, and 783

Buildings 727, 782, and 783 underwent a decontamination and decommissioning (D&D) process to ready it for final status radiological survey. In the D&D process, the buildings were stripped of utility services, and equipment and penetrations were removed or cut flush with the walls. All penetrations in the slab were grouted and will remain until environmental restoration is

accomplished. All areas where contamination was detected were decontaminated by the contractor prior to conducting the final survey. Buildings 727, 782, and 783 were initially subdivided into five survey units. The IVC randomly selected four units as part of the overall Building 779 independent verification. At the request of the Contractors, the IVC has prepared this stand-alone report for Buildings 727, 782, and 783.

1.4 Overview of the Assessment and Independent Verification Process

The approach used to independently determine whether Buildings 727, 782, and 783 met the mean, or average, benchmark release criteria (derived concentration guideline level-average concentration [DCGL_W]) followed the MARSSIM method. Ten of 49 survey units identified in the Building 779 Cluster were selected for actual measurement by the IVC. In this case, survey units 727-01, 727-02, 782-01 and 782-02 (Buildings 727, 782, and 783) were four of the ten selected for independent verification, thus meeting the contractual requirement to assess 5 to 10 percent of the Contractor's results. The IVC used oversight of the Contractor's scanning surveys and a critical review of the data collected by the Contractor to independently determine compliance with the maximum concentration benchmark release criteria (derived concentration guideline level-elevated measurement comparison [DCGL_{EMC}]).

The first step in the process to independently assess the Contractor's basis for decision on the disposition of Buildings 727, 782, and 783 was to review the Contractor's SAP (RMRS 1999a) and associated D&D planning documents. All comments and issues raised by the IVC were reported to DOE-RFFO and were addressed by the RFETS Contractor and implemented in the final status survey plan, as necessary.

The Contractor's SAP establishes the criteria which, when met, represent acceptable levels of risk from exposure to residual contamination which might be present in the building. DOE-RFFO, EPA, and CDPHE agreed upon surface contamination concentration criteria below which further remedial action would not be warranted. These criteria, or DCGLs, serve as the benchmarks against which the building surfaces were to be measured. The Contractor's DCGLs are:

- The mean removable alpha surface contamination concentration in the selected survey unit(s) is below 20 disintegrations per minute (dpm)/100 square centimeters (cm²).
- The mean total alpha surface contamination concentration attributable to transuranic radioactivity as measured by direct surface emission in the selected survey unit(s) is below 100 dpm/100 cm² (averaged over 1 square meter [m²]).
- The mean total alpha surface contamination concentration attributable to uranium series radioactivity¹ as measured by direct surface emission in the selected survey unit(s) is below 1,000 dpm/100 cm² (averaged over 1 m²).
- The maximum total alpha surface contamination concentration attributable to transuranic radioactivity as measured by direct surface emission in the selected survey unit(s) is below 300 dpm/100 cm².

¹In cases where isotopic composition is not determined, the SAP requires the application of the more restrictive limits associated with the transuranic series radionuclides.

- The maximum total alpha surface contamination concentration attributable to uranium series radioactivity as measured by direct surface emission in the selected survey unit(s) is below 5,000 dpm/100 cm².
- The mean total alpha contamination concentration attributable to transuranic radioactivity on and beneath a surface with a surface coating as measured by collection and analysis of a surface media sample in the selected survey unit(s) is below 100 dpm/100 cm².
- The mean total alpha contamination concentration attributable to uranium series radioactivity on and beneath a surface with a surface coating as measured by collection and analysis of a surface media sample in the selected survey unit(s) is below 1,000 dpm/100 cm².

After reviewing the Contractor's SAP, an IV SAP was constructed. The IV SAP was developed in consultation with DOE-RFFO, EPA, and CDPHE. It was designed to detect and measure the concentration of the radioactive contamination remaining in survey units selected for independent verification such that statistically appropriate analyses could be used to determine whether the results obtained by the Contractor in the same survey unit could be verified or corroborated by the IVC. The IV SAP alone does not collect enough data to make the required decision for the entire building but provides sufficient data for critical comparison with the Contractor's conclusion in a single survey unit. In the case of Buildings 727, 782, and 783, the IVC performed surveys and sampled four of five possible survey units (727-01, 727-02, 782-01, and 782-02) identified by the Contractor.

The next step was to observe and evaluate the Contractor's implementation of the final status survey against the criteria established in the SAP. The IVC Health Physicist is permanently assigned to Rocky Flats and works on site to observe the Contractor's sampling and survey methods and review analytical processes.

The fourth element of the independent verification process was to provide blind matrix samples to the Contractor for inclusion in their sample batches from Building 779 Cluster. The blind samples included both blanks and spikes of smear filter paper matrices and surface media matrices. Blind matrix samples were included in the Contractor's sample batches from Building 779 as the Contractor's manpower and schedule permitted. It is important to note that it is not critical to the sampling objective to introduce Stage-I quality control samples to a particular batch of the Contractor's samples or even while they are sampling a particular building or survey unit being considered for independent verification.

Finally, and with the approved IV SAP, the sampling plan was executed. The IVC collected samples and performed measurements in the selected survey units in order to corroborate the results obtained by the Contractor. The measurements and samples were obtained in accordance with the *Independent Verification Sampling and Analysis Plan for Building 779 Cluster* (DOE 1999a).

The field data was reviewed in the field with representatives from DOE and the Contractor. The EPA and CDPHE have been apprized of the results of independent verification field data collected. Field data was recorded both on paper (Appendix D) and electronically (Appendix H). Following data collection, the data was verified and reduced so that the appropriate comparisons and analyses could be conducted. The presentation of the results of the field sampling are

2.0 Field Investigation

2.1 Mobilization

Prior to mobilizing the independent verification sampling team at the site, each member of the team was provided with a copy of the IV SAP and was trained on the field sampling equipment and procedures to be used. The Contractor made detailed measurements of the buildings and supplied simple architectural drawings of the survey units in Buildings 727, 782, and 783 (727-01, 727-02, 782-01, and 782-02) to be used in laying out the sampling grids and sample locations.

Mobilization to the field began the week of January 24, 2000. The sampling team personnel had completed all required RFETS training necessary to support the sampling and survey work during a previous visit to RFETS. Equipment was staged and final details were arranged.

The radiation survey detectors selected for this application were gas-filled, proportional counters made by Eberline; model HP-100. Gas-filled detectors are subject to response and calibration variation with changes in altitude. Consequently, the HP-100 probes were field calibrated on site at the RFETS altitude and using RFETS supplied counting gas. The instrument and probe package was response checked and verified to be in working order and within the parameters established in the SAP. The surface media sampling tool was tested, and test measurements were made confirming the suitability of the measurement protocol. A walk-through of each building was made to assess the condition of the building, to identify any intrinsic safety issues, and to compare the building structure and features with the assumptions made and procedures outlined in the SAP. It was concluded that the assumptions used to develop the SAP and its associated procedures were consistent with the conditions existing in the buildings and that the procedures developed for characterizing the contaminant concentrations in the buildings accounted for these conditions.

2.2 Field Selection of Survey Units for Independent Verification

The first step in the sample allocation strategy was to select from among the 49 survey units available in the Building 779 Cluster those survey units to be sampled and surveyed by the IVC. The random selection process assigned greater weighting or priority to survey units with a classification indicating greater potential to exceed the allowable radiological concentration. By assigning weighting factors to the survey units based on radiological classification, the independent verification survey will preferably select survey units which have a higher probability of exceeding the applicable DCGLs. Class 1 survey units (the most likely to be contaminated) are three times more likely to be selected than Class 2 units and six times more likely than Class 3 units. Table 2-1 lists the 49 survey units identified by the Contractor for Building 779 (RMRS 1999b). A simple, commercially available, spreadsheet program with a random number generation feature was used to randomly select the survey units to be independently verified. Appendix A contains a printout of the survey units selected by the computer generated random number method. Survey units 727-01, 727-02, 782-01, and 782-02, (interior and exterior of Buildings 727, 782, and 783) were four of 49 units selected from the Building 779 Cluster.

Table 2-1. Survey Units Identified for Building 779 Cluster

Survey Unit Description	Survey Unit #	Survey Classification	Weight Factor
Rooms 170/172 Floor and Lower Walls plus Mezzanine	779-01	Class 1	6
Room 171 Vaults	779-02	Class 1	6
Rooms 171/172 Upper Walls and Ceilings	779-03	Class 2	3
Stairs, Rooms 270/272, and the Room 170 Dumbwaiter	779-04	Class 2	3
Exterior South/West Walls and Roof	779-05	Class 2	3
Exterior West Wall outside of Room 142, and Roof	779-06	Class 2	3
Exterior Annex A West/North Wall and Roof	779-07	Class 2	3
Dock Walls and Roof	779-08	Class 2	3
Exterior Walls and Roof of Admin Building, Duct Tower	779-09	Class 2	3
2 nd Floor Admin Building – Rooms 201 through 214	779-15	Class 3	1
Floor in Room 208	779-16	Class 1	6
1 st Floor Admin Building – Rooms 105 through 113	779-17	Class 3	1
Rooms 100, 101, 101A, 104, 116, 116A, 116B, 117	779-18	Class 3	1
Dock and Ramp	779-19	Class 3	1
Rooms 114, 115, 115A, Exhaust Duct Tower	779-20	Class 2	3
Rooms 143, 144, 145, 146, 147, 148, 151	779-21	Class 1	6
Room 150	779-22	Class 1	6
Room 152	779-23	Class 1	6
Rooms 154, 156	779-24	Class 1	6
Rooms 160, 160A	779-25	Class 1	6
Rooms 153, 153A, 153B, 155	779-26	Class 1	6
Rooms 157, 159	779-27	Class 1	6
Rooms 161, 163, 163A, 167, 167A	779-28	Class 2	3
Rooms 162, 164, 165, 166	779-29	Class 2	3
Hallway to Annex A, Bridge to B777	779-30	Class 2	3
Room 217	779-32	Class 1	6
Rooms 219, 221, 221A, 221B, 221C, 223, 225, 229, 230, 231, 232, 233, 235, 271, 273, 274, 275, 277	779-33	Class 2	3
Rooms 215, 218, 220, 224	779-34	Class 1	6
Rooms 222, 222A	779-35	Class 1	6
Rooms 216, 226	779-36	Class 1	6
Room 228	779-37	Class 1	6
Rooms 234, 234A, 234B	779-38	Class 1	6
Rooms 103, 103A, 103B, 118, 120, 121, 121A, 121B, 173	779-39	Class 2	3
Rooms 122, 123, 126, 127	779-40	Class 2	3
Rooms 142, 142 Mezzanine	779-41	Class 2	3
Rooms 119, 124, 125, 128, 129, 132, 134, 135, 136, 138	779-42	Class 2	3
Room 001 and Pits	779-43	Class 1	6
Rooms 130, 131, 133	779-44	Class 1	6
Room 137	779-45	Class 1	6
Rooms 139, 140, 140A, 140B	779-46	Class 1	6
Rooms 141, 141A, 141B, 141C	779-47	Class 1	6
B782 Exterior Wall and Roof	782-01	Class 2	3
B782 Plenum Area	782-02	Class 2	3
B782 Basement and Tunnel	782-03	Class 2	3
B727 and B783 Interior	727-01	Class 3	1
B727 and B783 Exterior	727-02	Class 2	3

2.3 Field Identification of Sample Locations

Once the survey units to be verified had been selected, the proposed location of each measurement and sample was laid out using the sample allocation protocol specified in the SAP. Drawings of the survey units were created with the walls and ceiling “unfolded” and set flat to assist the process of spatial distribution and sample location recording. The survey units were then divided by a 2-meter sampling grid superimposed over the surface of the survey units. Figure 2-1 shows the sample grid layout for survey units 727-01, 727-02, 782-01, and 782-02.

The selection and distribution of sampling locations within each survey unit was made using the protocol approved in the SAP including:

- Random selection of the sampling starting point within the selected survey unit(s) (Appendix A),
- Systematic distribution of sample locations within the selected survey unit(s) to ensure representative spatial coverage of the survey unit, and
- Personnel safety during the execution of the sampling plan

Drawings of each surface within the survey unit and actual sample locations as determined in the field are shown on Figure 2-2. After the sample locations were allocated, an inspection of each survey unit was conducted to ensure that each sample location selected could be accessed and sampled safely. Selected sample locations that were inaccessible or presented safety hazards were relocated in accordance with the sample relocation protocol outlined in the SAP due to safety issues. The samples relocated are annotated on the drawings in Figure 2-2.

Sample locations were next laid out on the building surfaces within the survey units. Each sample location was measured out and marked on the surface with a permanent marker. Unique alpha-numeric bar codes were affixed to the surface adjacent to the selected sample location. A duplicate bar code was affixed to the field data sheet and the bar code number was recorded on a copy of the survey unit drawings (Figure 2-3). It should be noted that all sample locations were selected without prior knowledge of contaminant concentrations in the area and before radiological survey instruments were employed. In this way, sample locations were not biased.

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 727 & 783

Survey Unit: 727-01

Number of Sample Locations: 29

Classification: 3

Survey Unit Description: Interior

Grid Size: 2m x 2m

SURVEY UNIT 727-01 MAP 1 OF 1

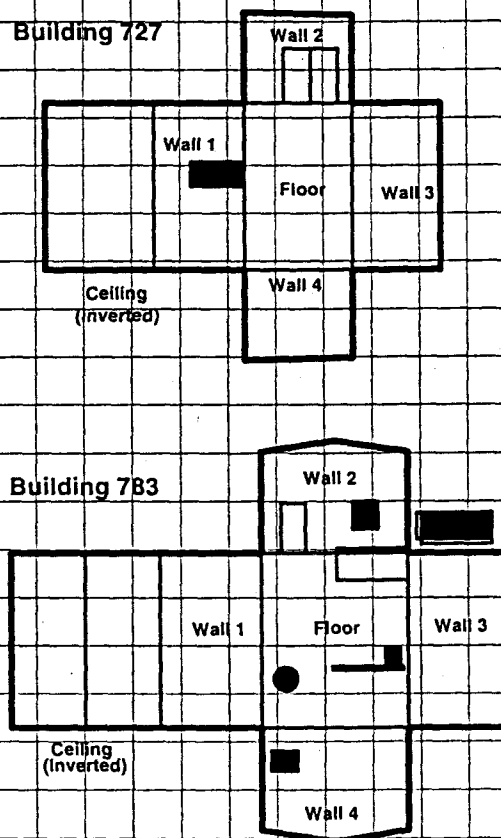


Figure 2-1. Sampling Grid—Survey Unit 727-01

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 727 & 783

Survey Unit: 727-02

Number of Sample Locations: 29

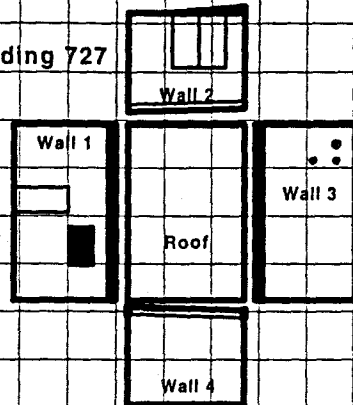
Classification: 3

Survey Unit Description: Exterior

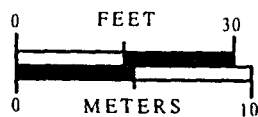
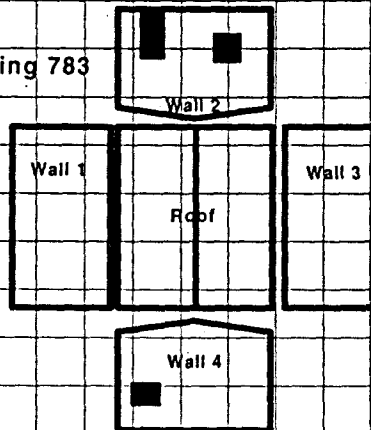
Grid Size: 2m x 2m

SURVEY UNIT 727-02 MAP 1 OF 1

Building 727



Building 783



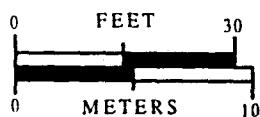
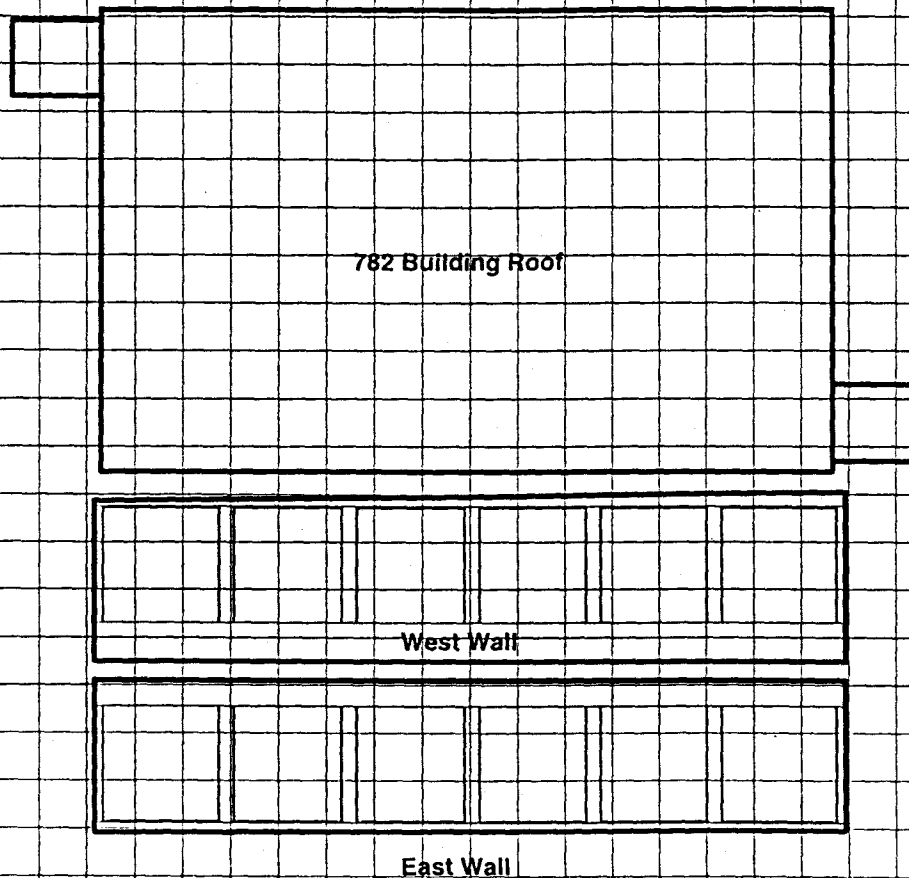
Each intersect point of the grid
within the frame of the survey unit
is a potential sample location

Figure 2-1 (continued). Sampling Grid—Survey Unit 727-02

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER**SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782 Survey Unit: 782-01 Number of Sample Locations: 29 Grid Size: 2m x 2m

Classification: 2 Survey Unit Description: Exterior Walls and Roof

SURVEY UNIT 782-01 MAP 1 OF 2

Each intersect point of the grid within the frame of the survey unit is a potential sample location

Figure 2-1 (continued). Sampling Grid—Survey Unit 782-01

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER**SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782

Survey Unit: 782-01

Number of Sample Locations: 29

Grid Size: 2m x 2m

Classification: 1 & 2

Survey Unit Description: Exterior Walls and Roof

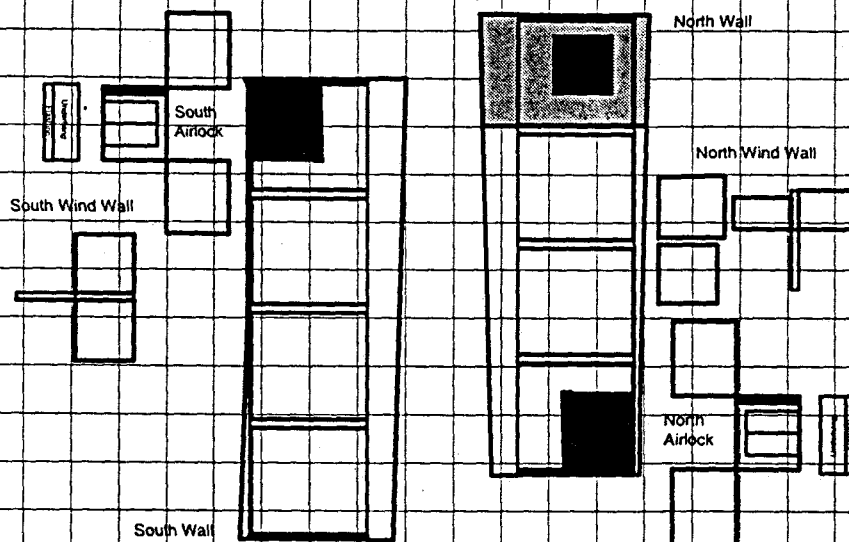
SURVEY UNIT 782-01 MAP 2 OF 2

Figure 2-1 (continued). Sampling Grid—Survey Unit 782-01

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782 Survey Unit: 782-02 Number of Sample Locations: 29 Grid Size: 2m x 2m

Classification: 2 Survey Unit Description: Plenum Area

SURVEY UNIT 782-02 MAP 1 OF 2

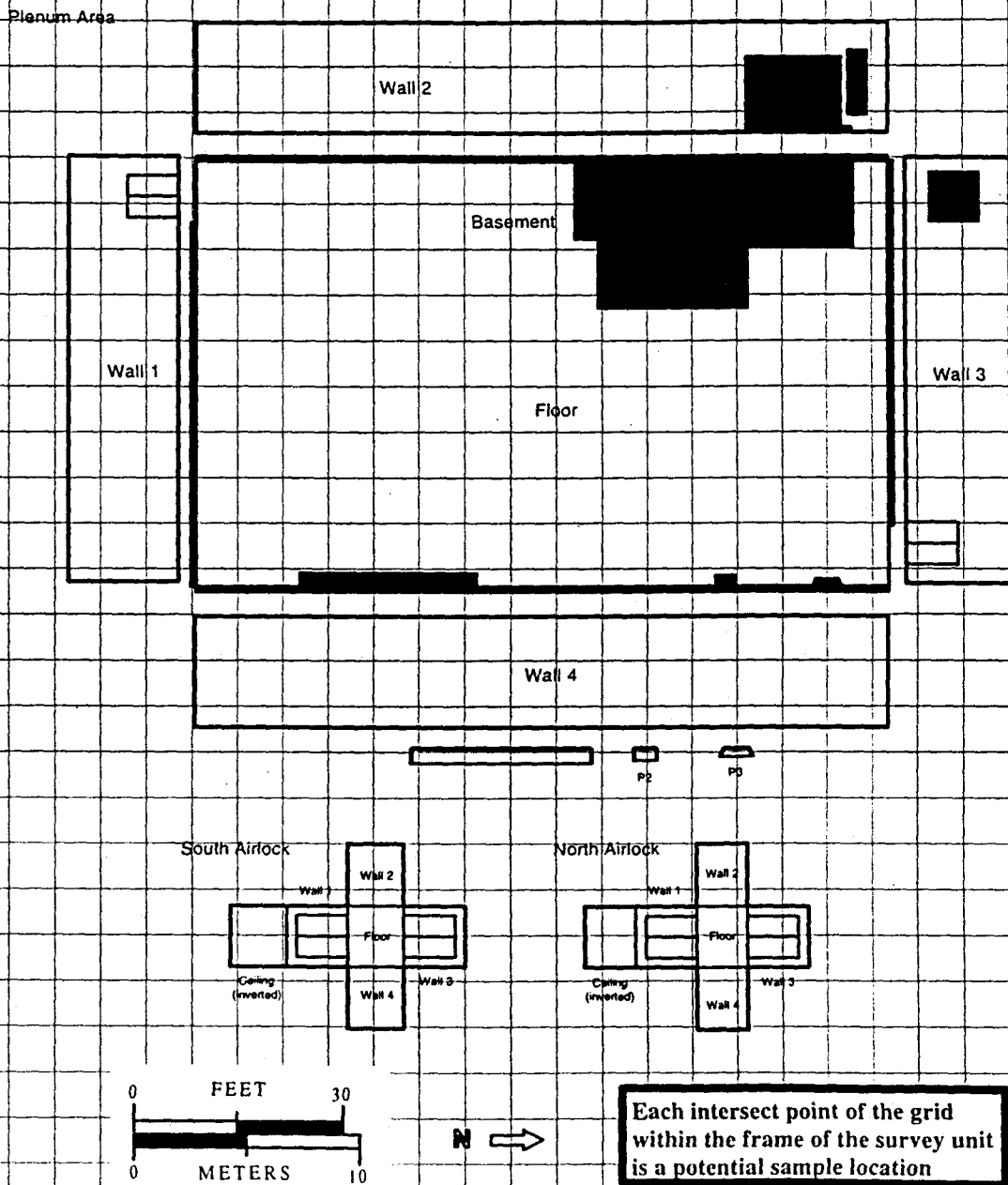
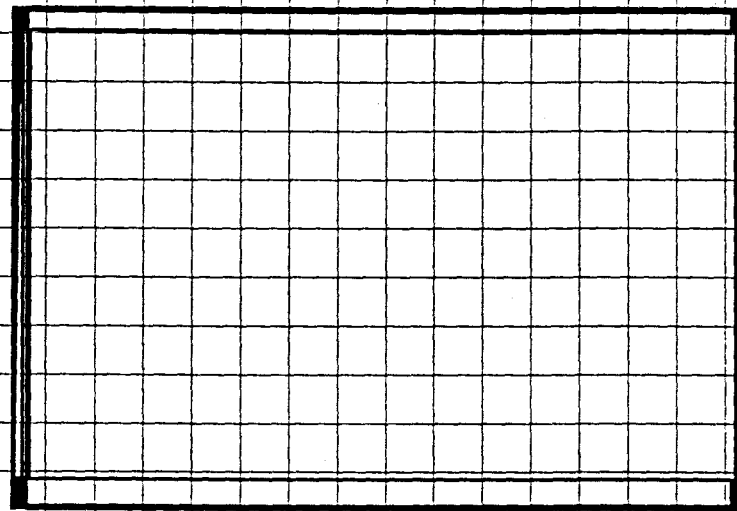


Figure 2-1 (continued). Sampling Grid—Survey Unit 782-02

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER**SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782 Survey Unit: 782-02 Number of Sample Locations: 29 Grid Size: 2m x 2m

Classification: 2 Survey Unit Description: Plenum Area

SURVEY UNIT 782-02 MAP 2 OF 2

Plenum Area

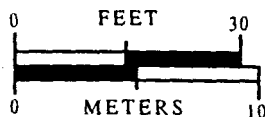
Ceiling
(inverted)**Each intersect point of the grid
within the frame of the survey unit
is a potential sample location**

Figure 2-1 (continued). Sampling Grid—Survey Unit 782-02

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER SURVEY SURVEY UNIT SAMPLE PLAN

Building: 727 & 783 Survey Unit: 727-01 Number of Sample Locations: 29

Classification: 3 Survey Unit Description: Interior Grid Size: 2m x 2m

SURVEY UNIT 727-01 MAP 1 OF 1

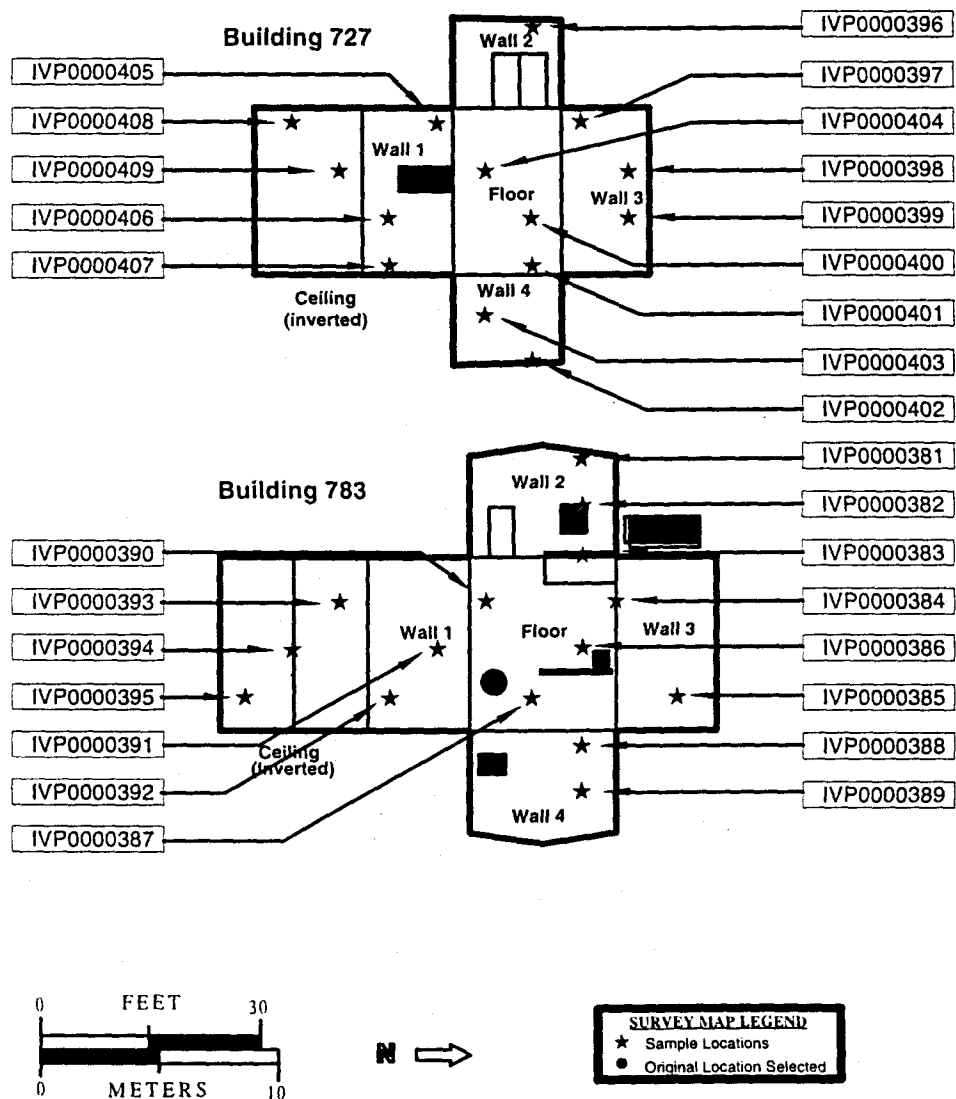


Figure 2-2. Selected Sample Locations—Survey Unit 727-01

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 727 & 783

Survey Unit: 727-02

Number of Sample Locations: 29

Classification: 3

Survey Unit Description: Exterior

Grid Size: 2m x 2m

SURVEY UNIT 727-02 MAP 1 OF 1

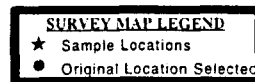
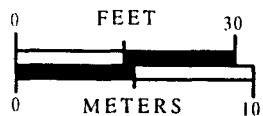
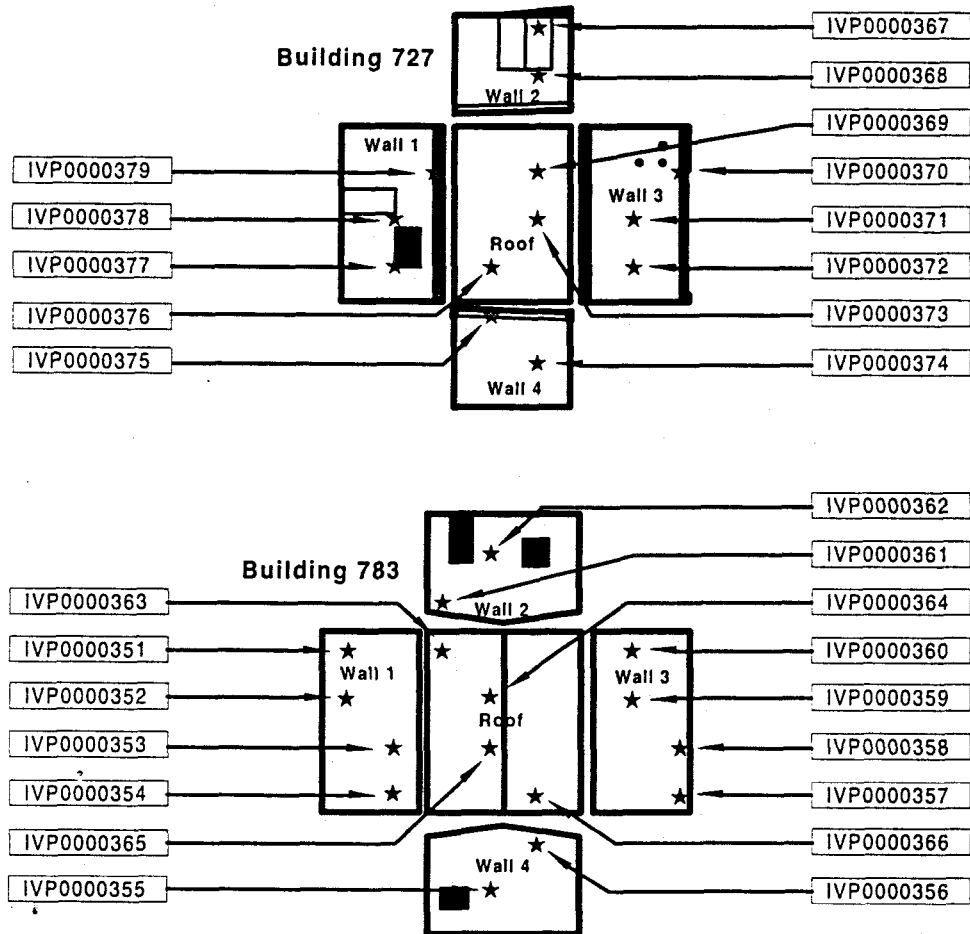


Figure 2-2 (Continued). Selected Sample Locations—Survey Unit 727-02

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY SURVEY UNIT SAMPLE PLAN

Building: 782 Survey Unit: 782-01 Number of Sample Locations: 29 Grid Size: 2m x 2m
 Classification: 2 Survey Unit Description: Exterior Walls and Roof

SURVEY UNIT 782-01 MAP 1 OF 2

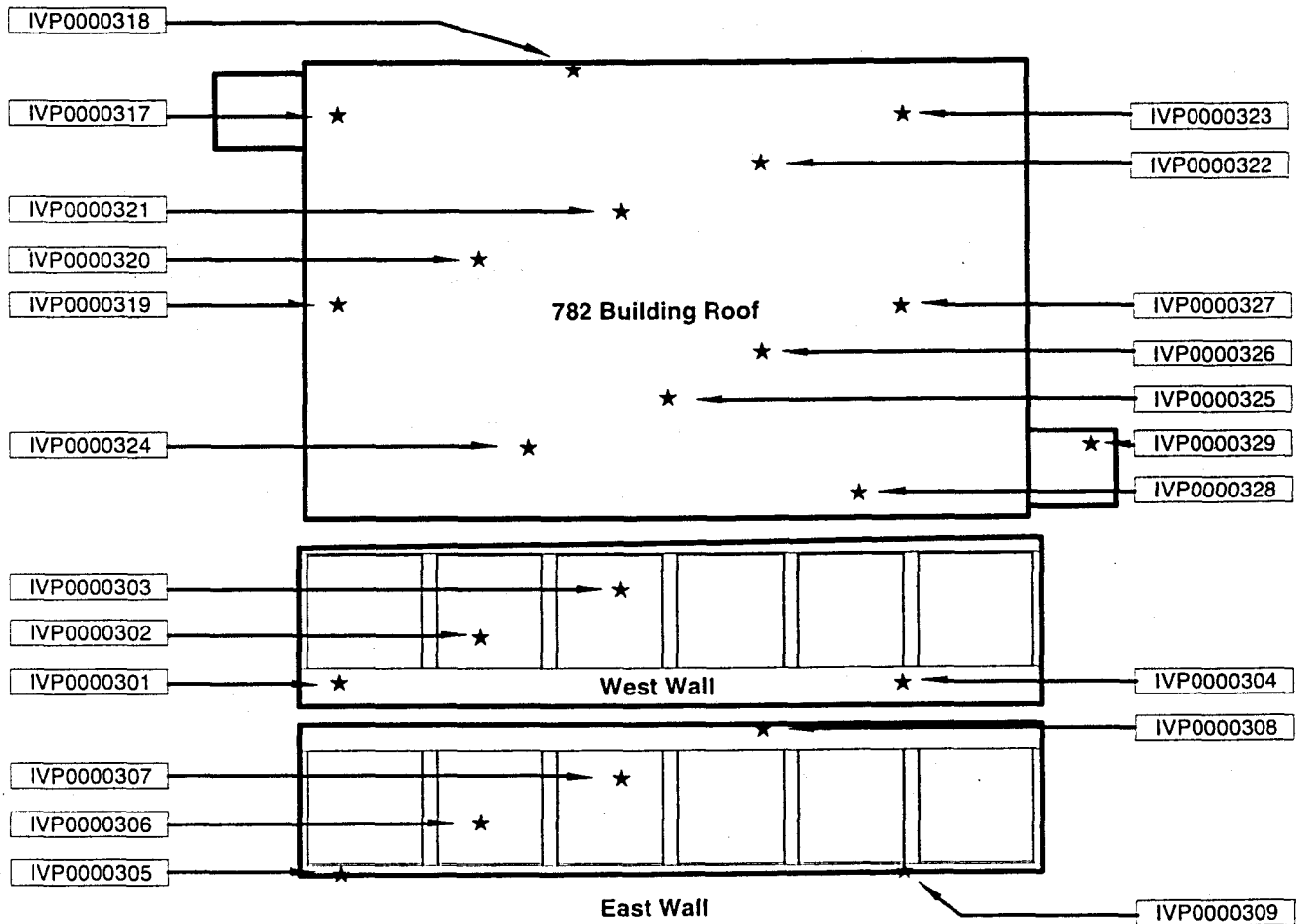


Figure 2-2 (Continued). Selected Sample Locations—Survey Unit 782-01

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER**SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782

Survey Unit: 782-01

Number of Sample Locations: 29

Grid Size: 2m x 2m

Classification: 1 & 2

Survey Unit Description: Exterior Walls and Roof

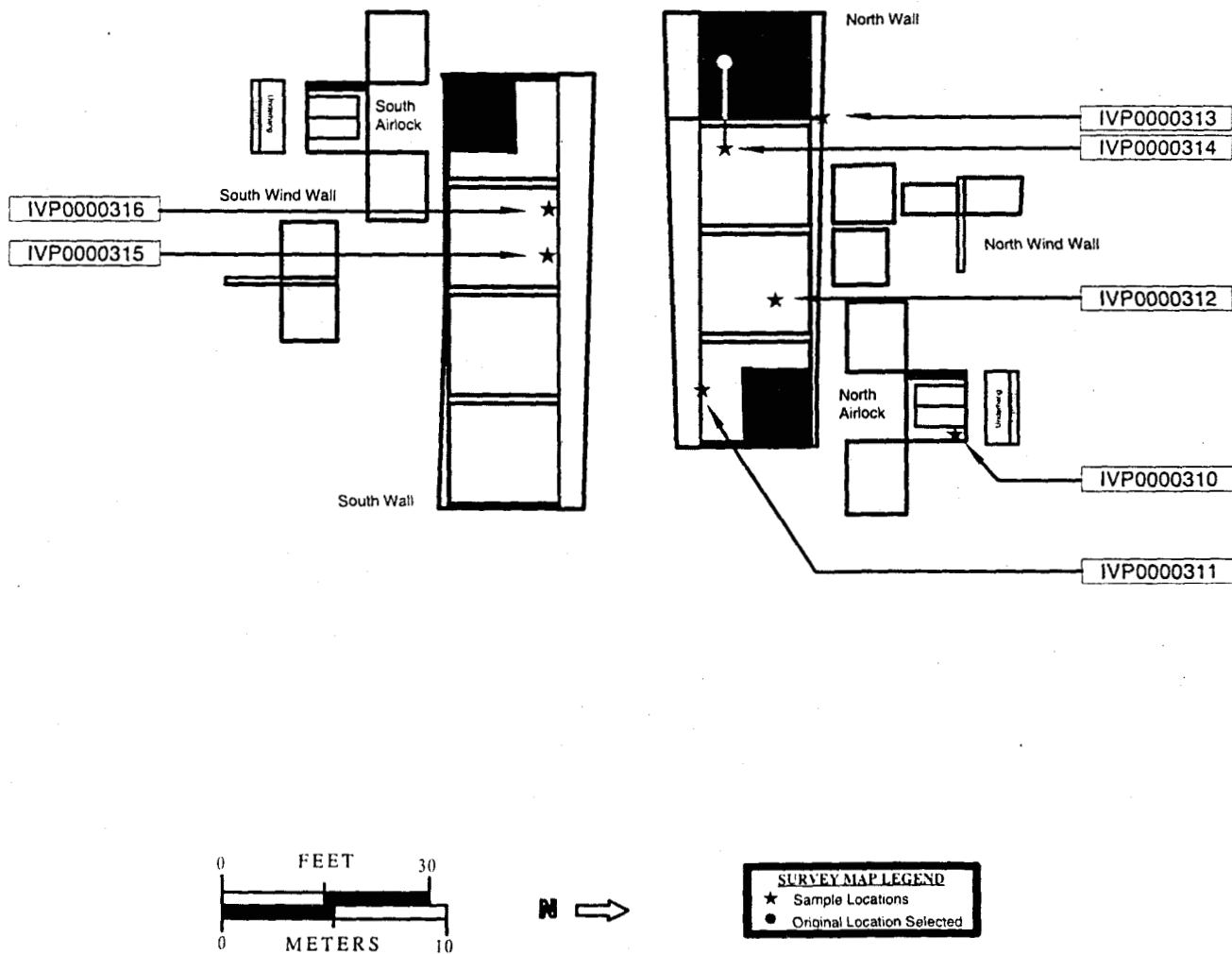
SURVEY UNIT 782-01 MAP 2 OF 2

Figure 2-2 (Continued). Selected Sample Locations—Survey Unit 782-01

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER **SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782 Survey Unit: 782-02 Number of Sample Locations: 29 Grid Size: 2m x 2m

Classification: 2 Survey Unit Description: Plenum Area

SURVEY UNIT 782-02 MAP 1 OF 2

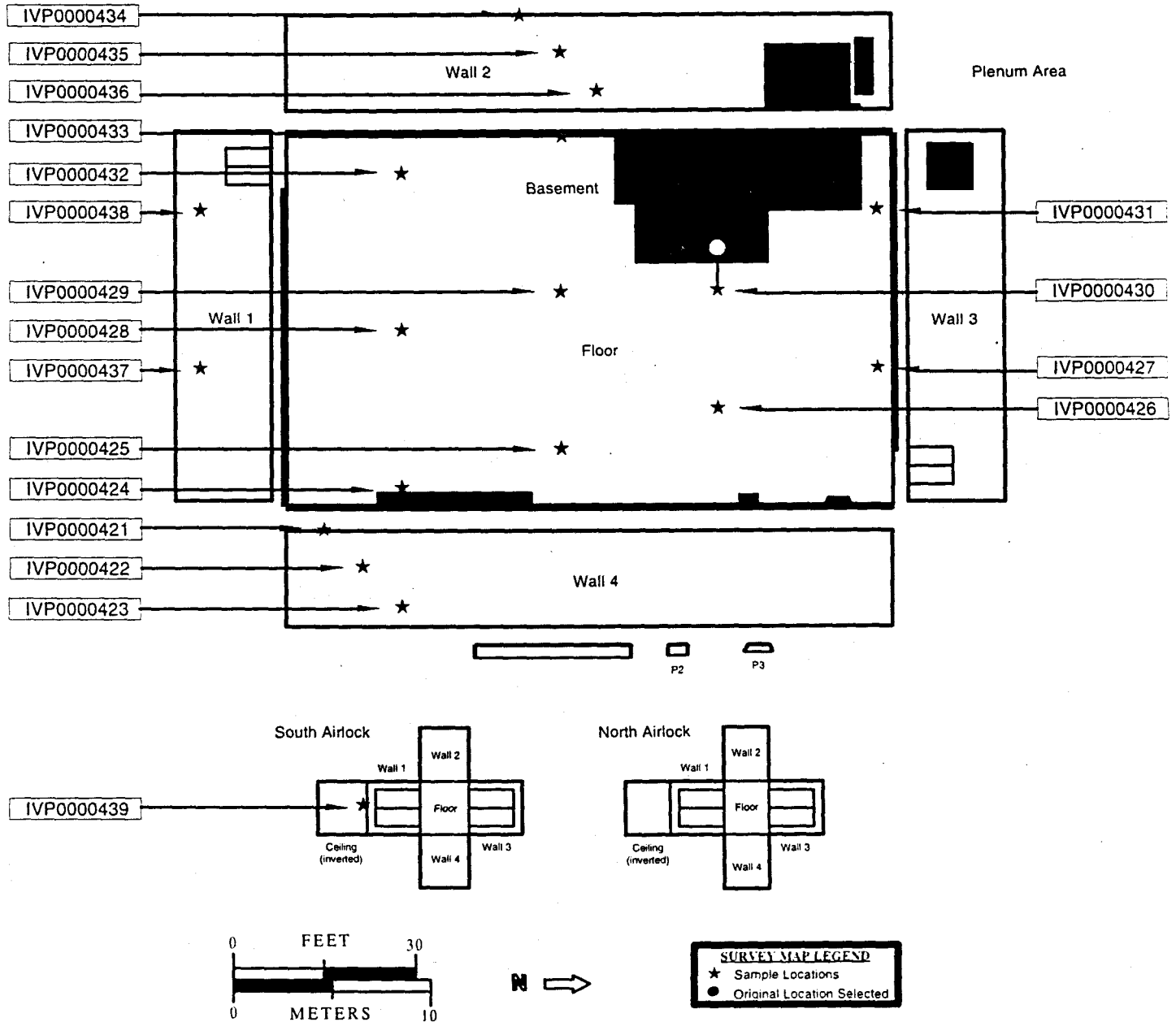


Figure 2-2 (Continued). Selected Sample Locations—Survey Unit 782-02

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER**SURVEY SURVEY UNIT SAMPLE PLAN**

Building: 782 Survey Unit: 782-02 Number of Sample Locations: 29 Grid Size: 2m x 2m

Classification: 2 Survey Unit Description: Plenum Area

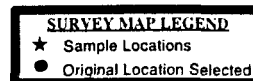
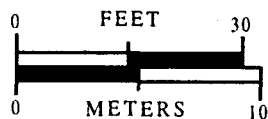
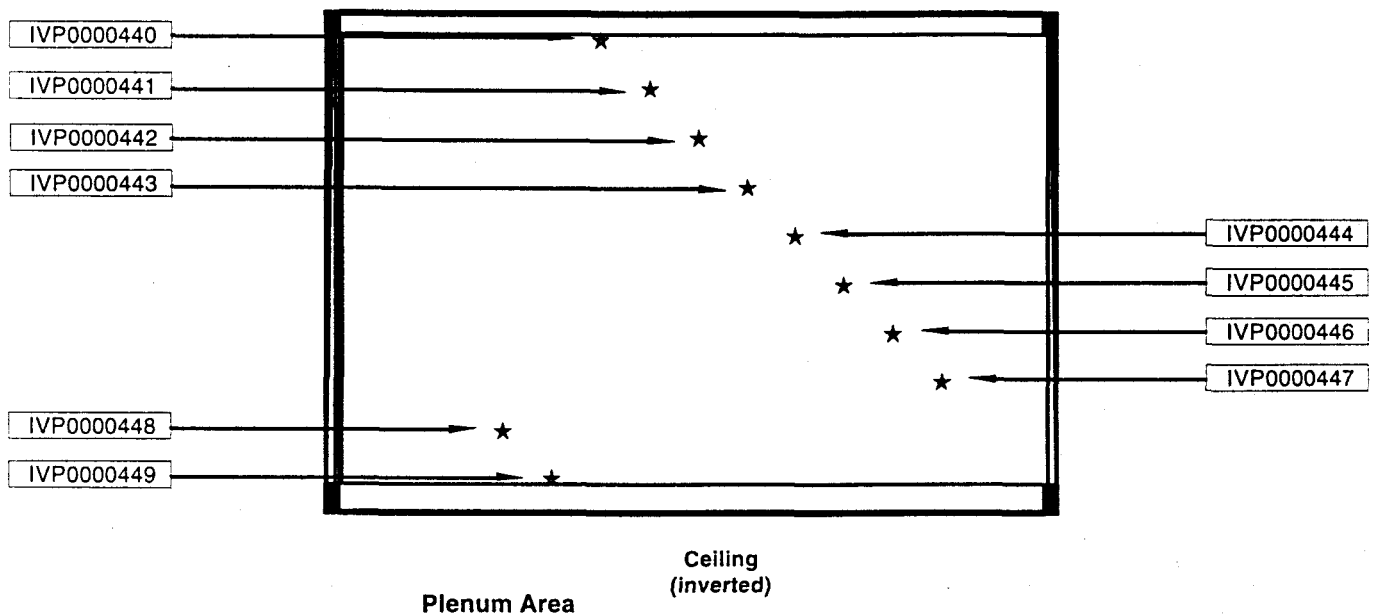
SURVEY UNIT 782-02 MAP 2 OF 2

Figure 2-2 (Continued). Selected Sample Locations—Survey Unit 782-02



Figure 2-3. Sample Location Identifier

2.4 Sampling Equipment and Procedures

2.4.1 Radiological Instrumentation

The field measurement instrument used for measuring surface deposited radiological contamination was the Eberline, E-600 Smart Portable Multi-purpose Radiation Survey Instrument with a modified Eberline HP-100 gas proportional detector probe. The detector was fitted with an Eberline "Smart Pack" to convert the conventional detector to be compatible with the microprocessor based E-600 and to electronically store the probe's calibration data. The probe's alpha channel was calibrated to a plutonium-239 (Pu-239) National Institute of Standards and Technology (NIST) traceable calibration source. The calibration certificate for the source is provided in Appendix B and the calibration data sheets for the instruments are provided in Appendix G. Figure 2-4 shows the configuration used to measure the alpha surface emission activity on the surfaces in the survey unit. The direct measurement data was collected in accordance with the procedure outlined in the SAP.

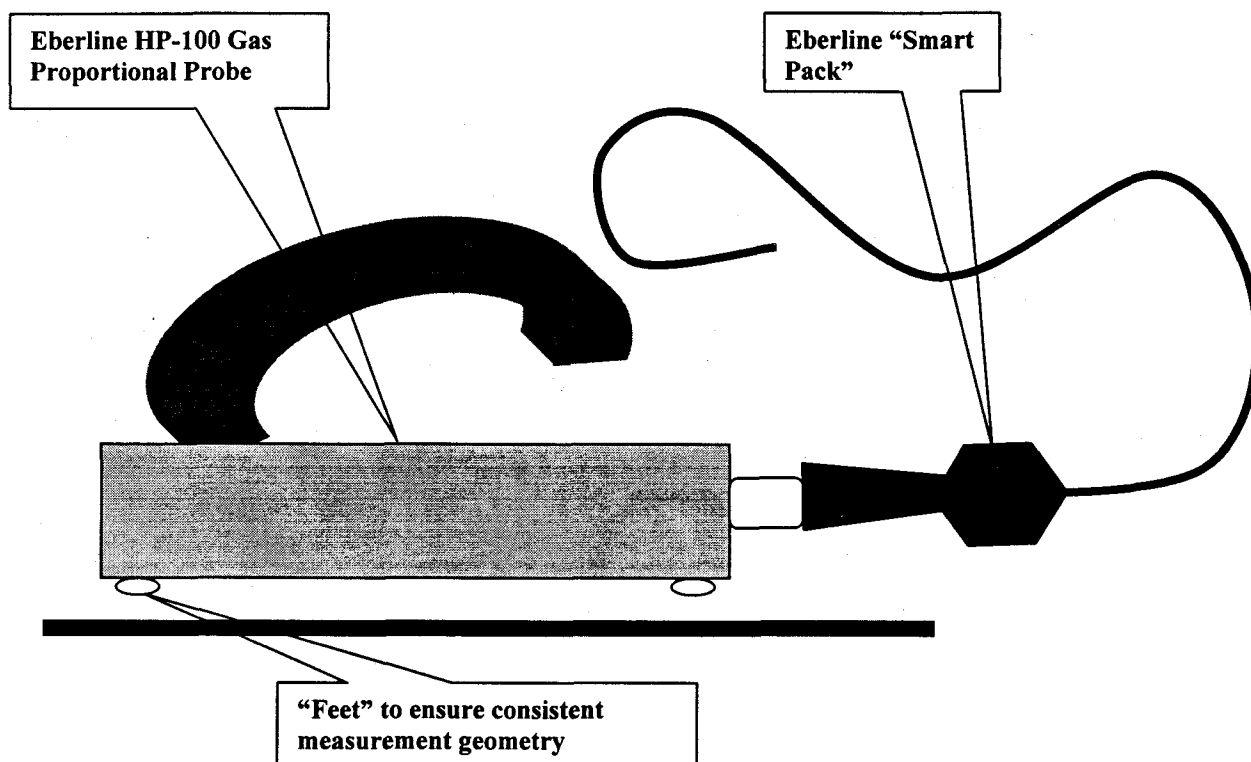


Figure 2-4. Direct Static Surface Contamination Measurement Configuration

2.4.2 Sampling

2.4.2.1 Smear Sampling

Smears were used to wipe the surfaces in order to measure the potential for removable radioactivity on the survey unit surfaces. The IVC chose to use 47 millimeter (mm) disc smears made of a duck cloth material rather than the typical paper or cellulose fiber filters commonly used since many of the surfaces requiring measurement are very rough. The duck cloth smears are very durable and will pick-up loose contaminants from even very rough or abrasive surfaces without disintegrating. The smear samples were collected after the direct static surface measurements were obtained. The technician wiped the surface within the 100 cm² sample area applying moderate pressure. Each smear was placed individually into a glassine envelope to prevent cross contamination and static charge induced migration of contaminants. Each glassine envelope containing a smear sample was then over-packed in a small sealable plastic bag and then in a manila sample envelope. The envelope was then marked with a bar code label linking it to the sample location from which it was obtained, and entered into a sample custody system to preserve sample integrity for subsequent analysis at the Grand Junction Office (GJO) Analytical Laboratory. The smear samples were secured in a sample box sealed with tamper-evident custody seals at the sample site until the field sampling was complete and then transported to the GJO Analytical Laboratory.

In all, 29 smear samples were collected from each survey unit—one at each of the 29 survey locations. These were submitted to the GJO Analytical Laboratory for radiological analysis. The results of these measurements are summarized in Section 3 and the laboratory analytical reports are contained in Appendix C.

2.4.2.2 Surface Media Sampling

Paint and other surface coatings or residues present on the surfaces of the buildings may present an obstruction to detection and measurement of the radioactive surface contamination that might be present. To assess the potential for, and measure the concentration of contaminants which might be present in and/or beneath painted or coated surfaces, a “veneer” of the surface (including any surface coating or residue) is removed from those sample locations that are painted or otherwise coated. When there is no surface coating or residue present, but the radiological measurement of the surface exceeds the *a priori* estimate of the critical detection level of 22 dpm/100 cm², a veneer of the substrate is collected to assess the potential for a near-surface contamination layer embedded in a porous surface (DOE 1999a). A heavy duty, rotary impact drill fitted with a special bit designed to pulverize the surface without drilling into it was used to obtain the media samples (Figure 2–5). The bit was inserted through a port in the containment. Only the bit penetrated the containment. The impact tool was moved over the surface removing the thinnest possible layer until all surface coating within the 100 cm² sample area was removed.

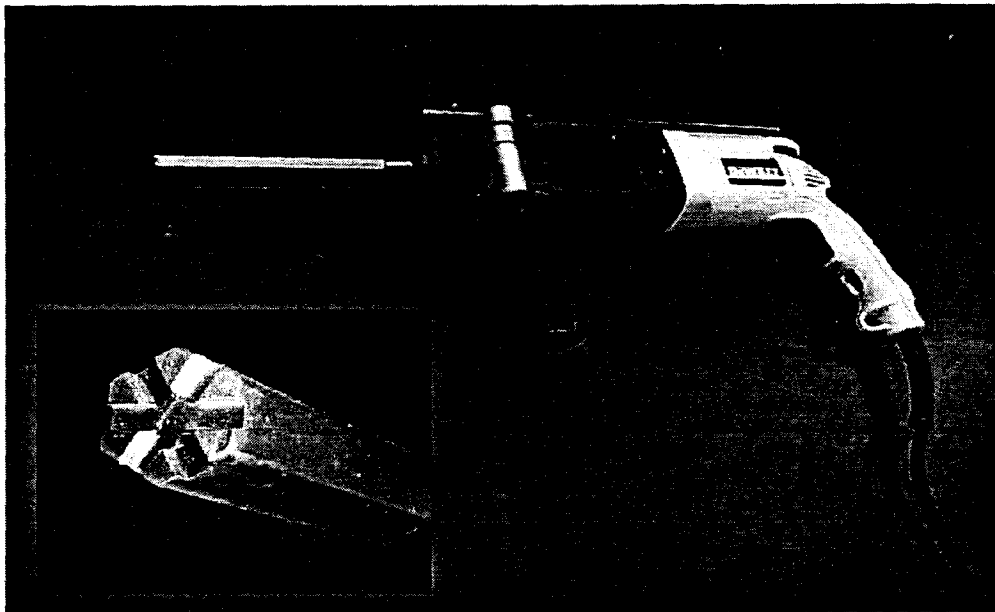


Figure 2-5. Photo of Rotary Impact Drill and Bit

The surface material removed (the sample) was collected in the bottom of the plastic containment. The technician collected the removed media as a sample. The sample was then transferred to a small sealable plastic vial. A bar code label linking the sample location from which it was obtained was affixed to the vial and entered into a sample custody system to preserve sample integrity for subsequent analysis at the GJO Analytical Laboratory (see Figure 2-6). The vials were placed in a sealable plastic bag and secured in a sample box sealed with tamper-evident custody seals at the sample site until the field sampling was complete and then transported to the analytical laboratory.

2.4.3 Laboratory Measurements

Smears and surface media samples were processed and analyzed at the GJO Analytical Laboratory using the methods and procedures identified in Tables 2-2 and 2-3 and prescribed in the IV SAP.

Table 2-2. Smear Sample Analytical Method

Laboratory Method—Gross Alpha Radioactivity	
Counting method	Gas Proportional Low-Background Alpha/Beta Counting System
Instrumentation	Canberra Model 2404
Procedure(s)	Procedure RC-8, "Gross Alpha/Beta Analysis" (WASTREN-GJ)
Laboratory procedures are governed by QA/QC procedures specified in Handbook of Analytical and Sample-Preparation Procedures (WASTREN-GJ).	

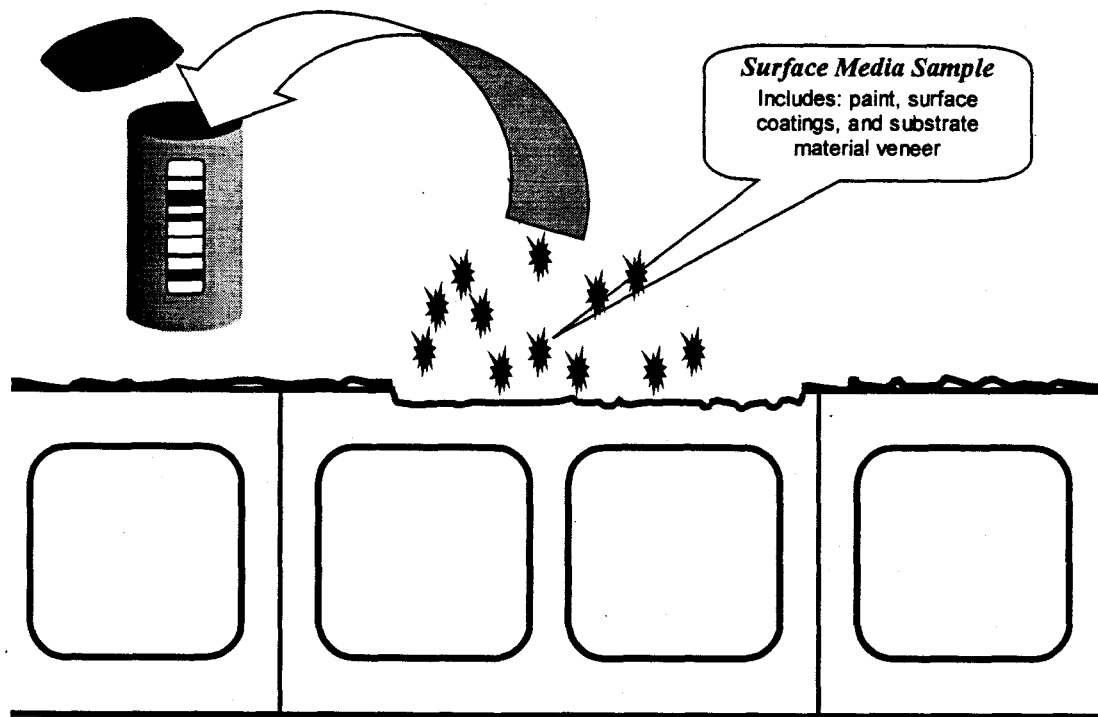


Figure 2-6. Surface Media Sample Collection

Table 2-3. Surface Media Sample Analytical Method

Laboratory Method—Alpha Radioactivity by Isotope Specific Species	
Counting method	Alpha radioactivity by alpha spectroscopy
Instrumentation	1" PIPS with Canberra Alpha Management Software (AMS) Model 48-0721, Ver. 1.0
Procedure(s)	Solids Digestion, Chemical Extraction, Sample Precipitation, and Sample Counting Procedure RC-19, "Alpha Spectrometry" (WASTREN-GJ).
Laboratory procedures are governed by QA/QC procedures specified in Handbook of Analytical and Sample-Preparation Procedures (WASTREN-GJ).	

Based on the EPA's terminology, the methods described in Tables 2-2 and 2-3 are categorized as Analytical Level V because they are non-conventional in the EPA's Contract Laboratory Program (CLP) (EPA 1988). However, comparing the level of quality assurance and quality control (QA/QC) embodied in these procedures, they are comparable to EPA's CLP Analytical Level IV.

2.4.4 Field Measurements

2.4.4.1 Background Determination

Background was determined in the survey unit being surveyed before, and at least every 2 hours during, each sampling shift. Additionally, background measurements were collected immediately prior to, and immediately after, changing out a detector probe. In the center of the survey unit, a masonite hardboard surface (the back of a clipboard) that has essentially no inherent alpha radioactivity and which was clearly "unaffected" (i.e., clearly not part of the potentially contaminated buildings within the 779 Cluster) was used for establishing background according

to the procedure detailed in the SAP. This method establishes the background associated with the instrument only. Background measurements were recorded both electronically and by hand.

2.4.4.2 Direct Static Surface Radioactivity Measurements

All 29 sample locations identified within each of the survey units were directly measured to assess the alpha radioactivity deposited on the surface. Direct static field measurements were made using the approved procedure in the IV SAP. Each measurement was collected for 90 seconds, in the instrument's "SCALER" operating mode, and at a fixed distance of approximately 0.125 inch (1/8th inch) from the surface. When the acquisition count time was complete, the result was read, manually recorded, and electronically logged into the instrument's memory. In cases where surface media samples were taken, a second direct static measurement was made at the same location following removal of the surface veneer. Often, the direct measurement readings obtained subsequent to the veneer removal was unchanged or greater indicating the likelihood that the substrate material (typically concrete) contained an appreciable and measurable alpha background radioactivity that was attenuated by the veneer¹. In these circumstances, a field decision was made as to the need for the collection of additional surface media to determine compliance with the DCGLs. Pertinent observations regarding the nature of the surface, substrate material, or instrument response were recorded. No anomalies were noted during the direct static measurement process.

¹To avoid the need for making reference survey unit measurements to characterize and quantify natural radioactivity, background has been narrowly defined in the Contractor's Closeout Radiological Survey Plan to include only radiation measured by the instrument system operating in "free air". This definition excludes radioactivity which might be present in the building materials but which has not been contributed or added by DOE. All naturally occurring radioactivity measured during Final Status Survey is to be considered "contributed" or attributable to DOE activities and compared to the applicable DCGLs.

3.0 Sampling and Survey Results

Sampling and survey results are divided into four basic categories for discussion, analysis, and comparison with the applicable DCGLs. The categories correspond to the three fundamental samples or measurements employed in the independent verification: Smear sampling, Direct Static Measurements, and Surface Media Samples. The fourth category is for QC data. Quality Control data is presented in Section 6.0 of this report.

3.1 Direct Static Field Measurements

Direct measurements of the radioactivity emission from surfaces were made using static, 90-second counting intervals, over which the total counts were integrated. The measurements recorded were gross values normalized to $\text{dpm}/100 \text{ cm}^2$. In the context of this sampling evolution, a "gross measurement" means a measurement made with a radiation detection instrument to which no background correction has been applied. Raw or gross data is important when measurements will be used to make statistical inferences, since not all data will necessarily have the same correction factors applied to properly reduce them to meaningful numbers. Reporting gross or raw data also permits one to analyze the functionality of the instrument with which the measurement was made, and to verify the appropriateness of the data reduction process. The data reduction process for the field measurement data collected in this sampling evolution involves corrections for the efficiency of the radiation detector to the subject radiation and the instrument response to background sources of radiation (excluding surface media contribution to background).

The use of the Eberline E-600 Smart Portable Multi-purpose Radiation Survey Instrument in this application provides a platform for accommodating the probe specific factors including efficiency, high voltage, discrimination thresholds, crossover correction factors, and calibration set up parameters within the detector's associated "smart pack" microchip. These correction factors are common to all of the direct field measurements made with the E-600 and HP-100 detector for this SAP. As a result of incorporating these factors, the instrument reads out and electronically logs data points directly in units of $\text{dpm}/100 \text{ cm}^2$. These readings were not, however, field corrected for background radiation.

3.1.1 Background Measurements

The assessment of an instrument's response to background radiation is important from two perspectives. First, it permits the assessment of the minimum sensitivity (detection limit) for the instrument and measurement process in the presence of background radiation. The *a posteriori* minimum detectable activity (MDA) is calculated from this actual background data. Second, by assessing the instrument's response to background radiation in terms of the units that field data will be collected, a correction can be applied to the field measurement data to permit determination of radioactivity present in excess of background. Because the naturally occurring concentrations of background radioactivity in building materials used in the construction of the buildings in the 779 Cluster were expected to be below and well within the DCGL benchmarks for radioactive contamination on building surfaces, the Contractor chose to assign all building material background radioactivity as part of the DOE contributed activity for comparison against the DCGL. As a result, no attempt was made to measure the concentrations of naturally occurring radioactivity measurable on surfaces in a "reference survey unit" or unaffected area. Still, there was the need to measure and account for the instrument's response to other sources of

background radiation (e.g., cosmic radiation) which could otherwise not be distinguished from the contaminant of concern.

To accommodate the need for correcting the instrument data for sensitivity to background radiation, excluding that present in the substrate of the surfaces being measured, instrument background measurements were collected periodically over the sampling period. In all, 48 measurements of the alpha background radiation level were recorded over the sampling period in accordance with the procedure for determining background (DOE 1999a). Each background measurement made during the sampling period is presented in Table 3-1.

Table 3-1. Direct Static Measurement Background Data, Buildings 727, 782, and 783

Sample Location	Survey Unit 727-01		Survey Unit 727-02		Survey Unit 782-01		Survey Unit 782-02	
	Date	Value (dpm/100 cm ²)	Date	Value (dpm/100 cm ²)	Date	Value (dpm/100 cm ²)	Date	Value (dpm/100 cm ²)
BACKGROUND	2/2/00	7.93	1/25/00	15.10	2/3/00	1.30	2/2/00	4.62
BACKGROUND	2/2/00	11.30	1/25/00	8.45	2/3/00	1.13	2/2/00	14.70
BACKGROUND	2/2/00	7.75	1/25/00	18.70	2/3/00	4.80	2/2/00	7.95
BACKGROUND	2/2/00	8.24	1/25/00	14.90	2/3/00	4.84	2/2/00	8.42
BACKGROUND	2/2/00	8.32	1/25/00	15.60	2/3/00	4.70	2/2/00	22.20
BACKGROUND	2/2/00	4.76	1/25/00	22.50	2/3/00	4.61	2/2/00	22.10
BACKGROUND	2/3/00	4.76	1/25/00	12.30	2/3/00	1.19	2/2/00	14.30
BACKGROUND	2/3/00	4.46	1/25/00	10.30	2/3/00	14.70	2/2/00	7.67
BACKGROUND	2/3/00	4.42	1/25/00	15.10	2/3/00	7.93	2/2/00	28.10
BACKGROUND	2/3/00	4.73			2/3/00	15.80	2/2/00	7.87
BACKGROUND	2/3/00	4.99			2/3/00	12.30	2/2/00	8.14
BACKGROUND	2/3/00	7.56			2/3/00	15.70	2/2/00	4.61
BACKGROUND							2/2/00	11.50
BACKGROUND							2/2/00	8.32
BACKGROUND							2/2/00	4.94

From the measurements presented in Table 3-1, it was determined that background did not change appreciably over the duration of each sampling period. When the direct static measurement background data is analyzed both graphically and with goodness-of-fit tests (Figure 3-1), it shows that the measurements are better represented by, or fit to, a log-normal distribution. This is the expected condition for instrument response to alpha background radiation due to the naturally low alpha background count rate and the Poisson distribution associated with low-level radiation counting. The direct static field measurements collected in the survey units also fit a log-normal distribution (see Section 3.1.2). The variance in the recorded background data was small and within the range expected for a gas proportional counter measuring alpha background radiation (see Appendix E for complete background data set).

DATA EVALUATION STATISTICS

Data Description

"Free Air" Instrument Background
Building 779 Cluster Independent Verification Project
Buildings 727 & 783, Survey Unit 727-01

Critical Level	22
UNITS - dpm/100 cm ²	
Sample Data	
4.42	
4.46	
4.73	
4.76	
4.76	
4.99	
7.56	
7.75	
7.93	
8.24	
8.32	
11.30	

Descriptive Statistics

Number of Samples	12.000
Mean	6.602
Median	6.275
Standard Deviation	2.214
CV	0.335443
Range	6.880
Minimum	4.420
Maximum	11.300
GM	6.284
GSD	1.383
Mean of LN(Data)	1.838
SD of LN(Data)	0.325
Percent > Critical Level	0.000

Normal Statistics

Mean	6.602
UCL(Mean) - Z	7.855
LCL(Mean) - Z	5.349
95%ile - Z	10.244
Percent > Critical Level	0.000
W Test (Data)	0.83973
Normal (α=0.05)?	No

Lognormal Statistics

GM	6.284
GSD	1.383
AM of data	6.602
AM - MVUE	6.594
AM - MLE	6.624
UCL - Norm t stats	8.009
LCL - Norm t stats	5.195
UCL LogNorm t	8.141
LCL LogNorm t	5.390
UCL - Modified Cox	8.151
LCL - Modified Cox	5.334
UCL - "Exact"	
LCL - "Exact"	
95%ile	10.717
UTL 95%, 95%	15.270
Percent > Critical Level	0.006
PEP (Upper)	0.353
PEP (Lower)	1.23E-07
W Test (ln Data)	0.84612
Lognorm (α=0.05)?	No

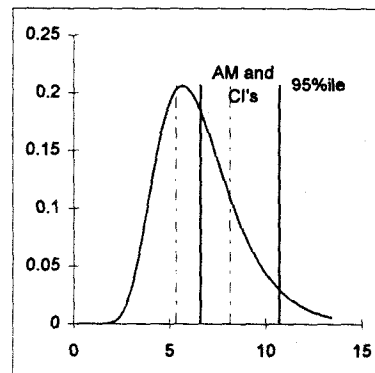
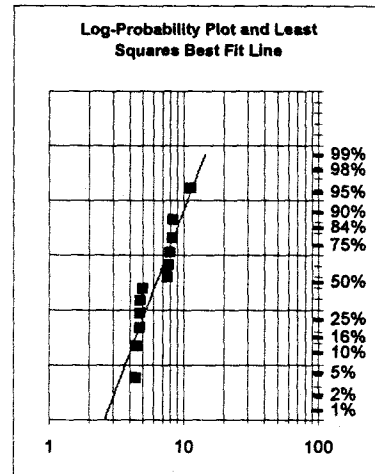
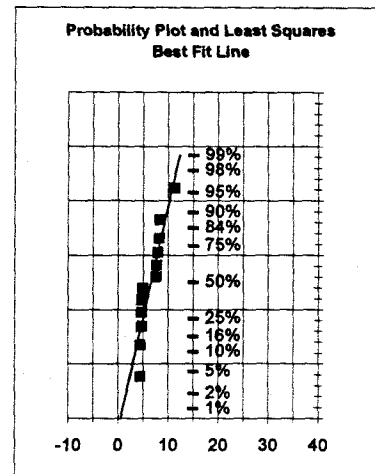


Figure 3-1. Data Evaluation Statistics—"Free Air" Instrument Background, 727-01

DATA EVALUATION STATISTICS

Data Description

"Free Air" Instrument Background
Building 779 Cluster Independent Verification Project
Buildings 727 & 783, Survey Unit 727-02

Critical Level 22	
UNITS - dpm/100 cm²	
Sample Data	
8.45	
10.30	
12.30	
14.90	
15.10	
15.10	
15.60	
18.70	
22.50	
Descriptive Statistics	
Number of Samples	9.000
Mean	14.772
Median	15.100
Standard Deviation	4.215
CV	0.285348
Range	14.050
Minimum	8.450
Maximum	22.500
GM	14.227
GSD	1.344
Mean of LN(Data)	2.655
SD of LN(Data)	0.296
Percent > Critical Level	11.111
Normal Statistics	
Mean	14.772
UCL(Mean) - Z	17.526
LCL(Mean) - Z	12.018
95%ile - Z	21.706
Percent > Critical Level	4.320
W Test (Data)	0.957868
Normal (α=0.05)?	Yes
Lognormal Statistics	
GM	14.227
GSD	1.344
AM of data	14.772
AM - MVUE	14.788
AM - MLE	14.862
UCL - Norm t stats	18.012
LCL - Norm t stats	11.532
UCL LogNorm t	18.655
LCL LogNorm t	11.841
UCL - Modified Cox	18.665
LCL - Modified Cox	11.717
UCL - "Exact"	
LCL - "Exact"	
95%ile	23.139
UTL 95%, 95%	34.861
Percent > Critical Level	7.020
PEP (Upper)	21.604
PEP (Lower)	0.349277
W Test (ln Data)	0.957372
Lognorm (α=0.05)?	Yes

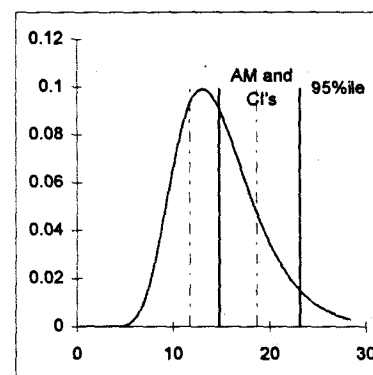
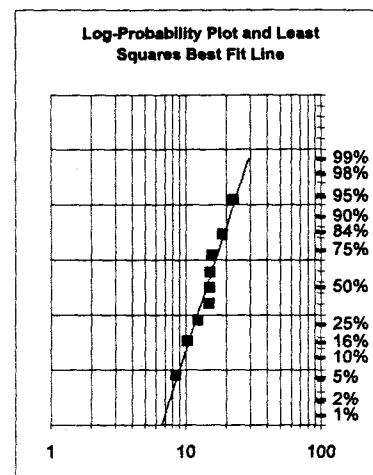
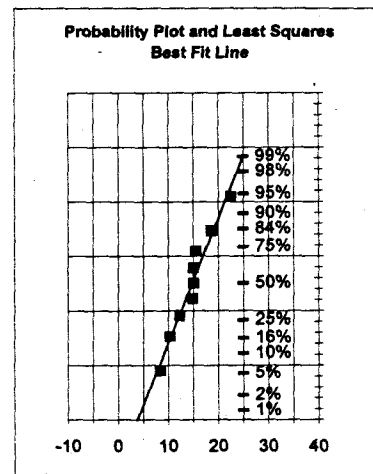


Figure 3-1 (continued) Data Evaluation Statistics—"Free Air" Instrument Background, 727-02

DATA EVALUATION STATISTICS

Data Description

"Free Air" Instrument Background
 Building 779 Cluster Independent Verification Project
 Building 782, Survey Unit 782-01

Critical Level	22
UNITS - dpm/100 cm ²	
Sample Data	
1.13	
1.19	
1.30	
4.61	
4.70	
4.80	
4.84	
7.93	
12.30	
14.70	
15.70	
15.80	

Descriptive Statistics	
Number of Samples	12.000
Mean	7.417
Median	4.820
Standard Deviation	5.725
CV	0.771878
Range	14.670
Minimum	1.130
Maximum	15.800
GM	5.105
GSD	2.708
Mean of LN(Data)	1.630
SD of LN(Data)	0.996
Percent > Critical Level	0.000

Normal Statistics	
Mean	7.417
UCL(Mean) - Z	10.656
LCL(Mean) - Z	4.178
95%ile - Z	16.834
Percent > Critical Level	0.543
W Test (Data)	0.851455
Normal (α=0.05)?	No

Lognormal Statistics	
GM	5.105
GSD	2.708
AM of data	7.417
AM - MVUE	7.926
AM - MLE	8.383
UCL - Norm t stats	11.054
LCL - Norm t stats	3.779
UCL LogNorm t	15.786
LCL LogNorm t	4.452
UCL - Modified Cox	17.389
LCL - Modified Cox	3.613
UCL - "Exact"	
LCL - "Exact"	
95%ile	26.277
UTL 95%, 95%	77.900
Percent > Critical Level	7.124
PEP (Upper)	19.338
PEP (Lower)	0.767154
W Test (In Data)	0.866555
Lognorm (α=0.05)?	Yes

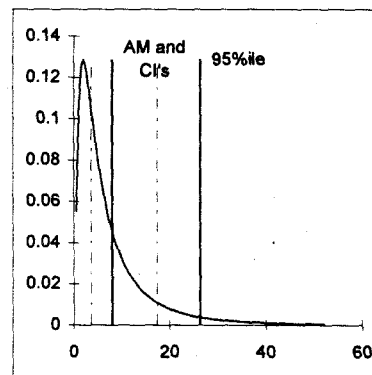
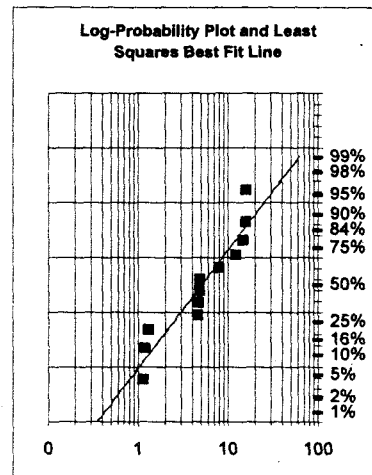
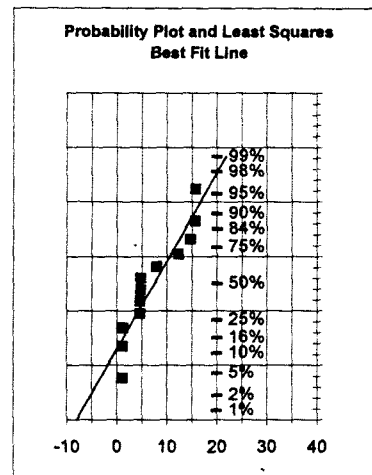


Figure 3-1 (continued) Data Evaluation Statistics—"Free Air" Instrument Background, 782-01

DATA EVALUATION STATISTICS

Data Description

"Free Air" Instrument Background
Building 779 Cluster Independent Verification Project
Building 782, Survey Unit 782-02

Critical Level	22
UNITS - dpm/100 cm ²	
Sample Data	
4.61	
4.62	
4.94	
7.67	
7.87	
7.95	
8.14	
8.32	
8.42	
11.50	
14.30	
14.70	
22.10	
22.20	
28.10	

Descriptive Statistics

Number of Samples	15.000
Mean	11.696
Median	8.320
Standard Deviation	7.217
CV	0.617006
Range	23.490
Minimum	4.610
Maximum	28.100
GM	9.973
GSD	1.775
Mean of LN(Data)	2.300
SD of LN(Data)	0.574
Percent > Critical Level	13.333

Normal Statistics

Mean	11.696
UCL(Mean) - Z	15.348
LCL(Mean) - Z	8.044
95%ile - Z	23.567
Percent > Critical Level	7.667
W Test (Data)	0.837152
Normal (a=0.05)?	No

Lognormal Statistics

GM	9.973
GSD	1.775
AM of data	11.696
AM - MVUE	11.611
AM - MLE	11.756
UCL - Norm t stats	15.692
LCL - Norm t stats	7.700
UCL LogNorm t	16.153
LCL LogNorm t	8.557
UCL - Modified Cox	16.388
LCL - Modified Cox	8.227
UCL - "Exact"	
LCL - "Exact"	
95%ile	25.624
UTL 95%, 95%	43.462
Percent > Critical Level	8.392
PEP (Upper)	19.729
PEP (Lower)	1.542595
W Test (ln Data)	0.92152
Lognorm (a=0.05)?	Yes

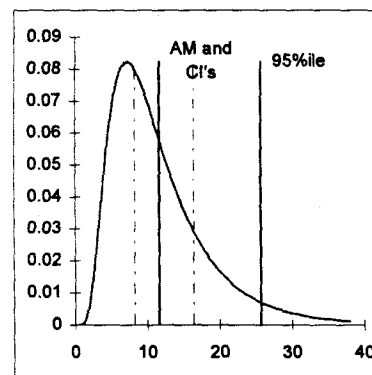
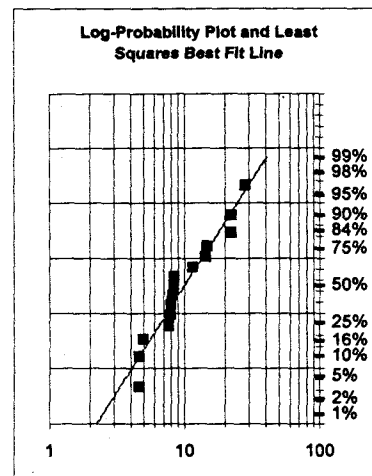
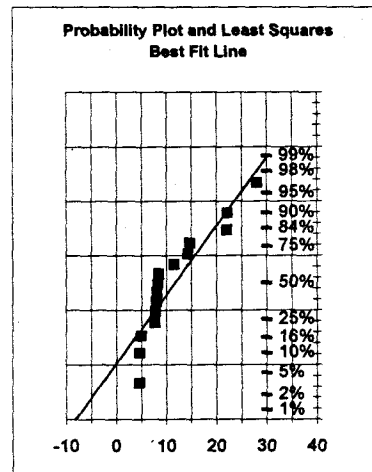


Figure 3-1 (continued) Data Evaluation Statistics—"Free Air" Instrument Background, 782-02

Table 3-2 shows the background data summary statistics.

Table 3-2. Background Data Summary Statistics

Statistic	Survey Unit 727-01	Survey Unit 727-02	Survey Unit 782-01	Survey Unit 782-02
Number of Measurements	12	9	12	15
Arithmetic Mean	6.6	14.8	7.4	11.7
Standard Deviation (sample)	2.2	4.2	5.7	7.2
Coefficient of Variation	0.34	0.29	0.77	0.62
Max	11.3	22.5	15.8	28.1
Median	6.3	15.1	4.8	8.3
Minimum	4.4	8.5	1.1	4.6
Range	6.9	14.1	14.7	23.5
Geometric Mean	6.3	14.2	5.1	10.0
UCL (log-normal "t", $\alpha=0.05$)	8.1	18.7	15.8	16.2
LCL (log-normal "t", $\beta=0.05$)	5.4	11.8	4.5	8.6

3.1.1.1 Background Adjustment

Because the background and survey unit sample sets were each log-normally distributed, it was decided that the geometric (or log-normal) mean background value recorded over the sampling period (6.3, 14.2, 5.1, and 10.0 dpm/100 cm², respectively) would be used to correct the gross direct static surface contamination measurements for subsequent comparison to the applicable DCGL. In some situations, a graphical or visual distinction can be made between measurements containing background only and those with added radioactivity. For example, when elevated or contributed activity is present, a graphical distinction can be clearly seen between the population of measurements containing only background response and those containing elevated or contributed activity. This is not typically the case with alpha radioactivity. No graphic distinction between measurement results attributable to background and those with activity in excess of background is clearly discernable with this data set.

Calculational methods are needed to assess the surface activity above background that could be distinguished with statistical significance from background. As discussed earlier, the geometric mean instrument background measurements over the field sampling period were 6.3, 14.2, 5.1, and 10.0 dpm/100 cm², respectively. With the E-600 instruments used, the background radiation influence on the instrument's readings was processed with efficiency corrections and probe size corrections such that background measurements and sample measurements alike read out in units of dpm/100 cm². In order to calculate the statistically significant surface activity, which could be distinguished from background (*a posteriori* MDA), it was necessary to convert the background measurement units from dpm/100 cm² to units of counts per minute (cpm). In this case, the more conservative metric, the arithmetic mean, was chosen to calculate the detection sensitivity achieved to prevent overstating the actual sensitivity achieved. The converted mean background count rates for the sampling periods are 1.29, 2.88, 1.44, and 2.28 cpm, respectively (Table 3-3). Using the actual instrument field measurement parameters, a calculation of the actual field measurement MDA can be determined by solving Equation 3-1.

Table 3-3. Static Surface Contamination Measurement MDA Parameters

Parameter		Value Used				Remarks
		779-21	779-21	779-23	779-21	
C _b	Background Counts	1.93	4.33	2.16	3.42	Values used are 6.6, 14.8, 7.4, and 11.7 dpm/100 cm ² converted to units of counts (cpm × T _s)
T _s	Sample count time in minutes	1.5	1.5	1.5	1.5	Count time programmed into the calibrated instrument specifically for this sampling event
A _p	Probe size	100	100	100	100	cm ²
ε _T	Instrument system efficiency in counts per disintegration	0.1949	0.1949	0.1949	0.1949	Actual efficiency for the individual probe is programmed into the memory chip of the probes' smart pack and for the probe used was 19.49%.

The following calculations define the *a posteriori* MDA.

$$MDA = \frac{3 + 4.65\sqrt{C_b}}{T_s \times \frac{A_p}{100\text{cm}^2} \times \epsilon_T} \quad (3-1)$$

Where: MDA = the minimum surface activity concentration above background radioactivity (in dpm/100 cm²) that can be detected with 95 percent confidence.

C_b = the total number of background counts over the sample count period (T_s).

T_s = sample count time (in minutes).

A_p = probe size (in cm²).

ε_T = counting system efficiency in count/disintegration.

Survey Unit 727-01

$$MDA = \frac{3 + 4.65\sqrt{1.93}}{1.5 \times 1 \times 0.1949}$$

Survey Unit 727-02

$$MDA = \frac{3 + 4.65\sqrt{4.33}}{1.5 \times 1 \times 0.1949} \quad (3-2)$$

Survey Unit 782-01

$$MDA = \frac{3 + 4.65\sqrt{2.16}}{1.5 \times 1 \times 0.1949}$$

Survey Unit 782-02

$$MDA = \frac{3 + 4.65\sqrt{3.42}}{1.5 \times 1 \times 0.1949}$$

Survey Unit 727-01

$$MDA = \frac{9.46}{0.2924} = 32 \text{ dpm/100 cm}^2$$

Survey Unit 727-02

$$MDA = \frac{12.68}{0.2924} = 43 \text{ dpm/100 cm}^2 \quad (3-3)$$

Survey Unit 782-01

$$\text{MDA} = \frac{9.83}{0.2924} = 34 \text{ dpm/100 cm}^2$$

Survey Unit 782-02

$$\text{MDA} = \frac{11.60}{0.2924} = 40 \text{ dpm/100 cm}^2$$

Therefore the "gross" field instrument readings, using the procedures identified in the Building 779 Cluster IV SAP, which can be distinguished as different from background (the adjusted gross MDA) are:

Survey Unit 727-01

$$7 + 32 = 39 \text{ dpm/100 cm}^2$$

Survey Unit 727-02

$$15 + 43 = 58 \text{ dpm/100 cm}^2 \quad (3-4)$$

Survey Unit 782-01

$$7 + 33 = 40 \text{ dpm/100 cm}^2$$

Survey Unit 782-02

$$12 + 40 = 52 \text{ dpm/100 cm}^2$$

Having identified the *a posteriori* MDA for the field sampling measurements and the adjusted gross MDAs, a simple sort of the gross field measurement data points was performed to identify those measurements from survey units 727-01, 727-02, 782-01, and 782-02 which were greater than 39 dpm/100 cm², 58 dpm/100 cm², 33 dpm/100 cm², and 52 dpm/100 cm², respectively. Those locations with gross surface activity greater than the adjusted gross MDA are credited as positive indicators of added radioactivity, while those less than the adjusted gross MDA are statistically indistinguishable from background values.

Rather than correct each individual measurement for background, the gross measurement data set was statistically analyzed. The data set was treated as log-normally distributed, the best fit for the data set collected. This treatment conforms to standard EPA methodology for data evaluation statistics, and generally yields conservative estimates of the upper confidence intervals and percentiles values. To correct for the instrument's response to background, the geometric mean background, 6.3, 14.2, 5.1, and 10.0 dpm/100 cm², respectively, was subtracted from the geometric mean of the total surface activity measured by surface emission data set of interest. When comparisons of other metrics (e.g., the median) are provided for information, the comparable background metric is also used to correct the reading for background radiation influence. For example, when the net (background corrected) *median* direct static surface contamination metric is reported, the *median* value of the background data set has been subtracted from the *median* value of the gross direct static surface contamination measurement data set.

3.1.2 Field Measurement Data

Direct static measurements were made at the 29 selected sample locations in each of the four survey units (727-01, 727-02, 782-01, and 782-02). Figure 2-2 shows the layout of both survey units and the sample locations selected in accordance with the sample allocation protocol identified in the IV SAP (DOE 1999a). These measurements were made prior to the collection of a smear sample, but subsequent to the collection of media samples. In this way, the "total" surface deposited activity emission rate, whether from fixed or removable radioactivity, was accounted for. Direct static measurements were taken adjacent to the sample locations where media samples had been taken. In all, 33 (34 in 727-02) direct static surface measurements were

made in each survey unit. Four of these, in each survey unit (five for 727-02), were replicate measurements collected as part of the overall QA/QC as described in the SAP. For data reduction purposes, the arithmetic mean of a replicate measurement and the corresponding initial measurement was used as the reported value for a specific sample location at which a replicate measurement was made. Consequently, there are a total of 29 data points (Table 3-4) for each survey unit included in the overall characterization of the building's mean residual surface contamination level as measured by direct surface emission. Further information about the duplicate samples and the assurance of precision and variability is presented in Sections 6.0 and 7.0.

A number of statistical tests of the data were performed to assess the data sets. A key test of the data set is for goodness-of-fit. It is important because it identifies the underlying distribution of the data set and permits the analyst as well as the decision makers and risk managers to compare appropriate metrics calculated from the data. The W-test was used to measure the relative goodness of the fit of the observed data distribution to the normal and log-normal standard distributions. Other distributions were not entertained for this data set since the data were expected to be either normally or log-normally distributed (based on knowledge of radioactivity distribution in the environment and in background) and because the probability plots and histograms generated gave no evidence that other than normal or log-normal distributions might be present. For the direct static measurement data set, the W-test identified the log-normal distribution as the best fit. The data evaluation statistics are provided in Figure 3-2. Table 3-5 summarizes the direct surface measurement data, uncorrected for background, collected in survey units 727-01, 727-02, 782-01, and 782-02.

From Table 3-5 and the data evaluation and summary statistics, it is evident that for survey unit 727-01, approximately 45 percent of all the measurements are below the geometric mean background value of 6.3 dpm/100 cm² and approximately 93 percent are below the critical detection level of 22 dpm/100 cm². All measurements are below the adjusted gross minimum detectable activity (MDA_{Gross}) of 32 dpm/100 cm² for the field measurement process.

For survey unit 727-02, 17 percent of the measurements taken are below the geometric mean background value of 14.2 dpm/100 cm² and 76 percent are at or below the critical detection level of 22 dpm/100 cm². All measurements are below the MDA_{Gross} of 43 dpm/100 cm² for the field measurement process.

For survey unit 782-01, 21 percent of the measurements taken are below the geometric mean background value of 5.1 dpm/100 cm² and 83 percent are at or below the critical detection level of 22 dpm/100 cm². Only one measurement (34.5 dpm/100 cm² at survey location IVP0000301) exceeded the MDA_{Gross} of 34 dpm/100 cm² for the field measurement process.

For survey unit 782-02, 38 percent of the measurements taken are below the geometric mean background value of 10.0 dpm/100 cm² and all but one are below the critical detection level of 22 dpm/100 cm². All measurements are below the MDA_{Gross} of 40 dpm/100 cm² for the field measurement process.

Table 3-4. Direct Static Surface Contamination Measurements, Survey Units 727-01, 727-02, 782-01, and 782-02

Survey Unit 727-01		Survey Unit 727-02		Survey Unit 782-01		Survey Unit 782-02		Instrument Operating Mode	Channel Selected	Background Compensation Mode
Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²			
IVP0000381	8.94	IVP0000351	12.30	IVP0000301	34.50	IVP0000421	10.40	Scaler	Alpha	Gross
IVP0000382	2.04	IVP0000352	8.82	IVP0000302	31.10	IVP0000422	24.10	Scaler	Alpha	Gross
IVP0000383	5.46	IVP0000353	21.50	IVP0000303	13.80	IVP0000423	20.60	Scaler	Alpha	Gross
IVP0000384	5.05	IVP0000354	20.10	IVP0000304	24.10	IVP0000424	6.94	Scaler	Alpha	Gross
IVP0000385	1.85	IVP0000355	15.70	IVP0000305	17.50	IVP0000425	17.50	Scaler	Alpha	Gross
IVP0000386	9.40	IVP0000356	17.30	IVP0000306	12.25	IVP0000426	14.00	Scaler	Alpha	Gross
IVP0000387	20.90	IVP0000357	21.90	IVP0000307	24.20	IVP0000427	3.96	Scaler	Alpha	Gross
IVP0000388	2.03	IVP0000358	20.50	IVP0000308	24.10	IVP0000428	7.26	Scaler	Alpha	Gross
IVP0000389	1.84	IVP0000359	21.10	IVP0000309	14.10	IVP0000429	7.15	Scaler	Alpha	Gross
IVP0000390	17.70	IVP0000360	20.60	IVP0000310	7.36	IVP0000430	7.23	Scaler	Alpha	Gross
IVP0000391	1.90	IVP0000361	12.40	IVP0000311	10.90	IVP0000431	11.10	Scaler	Alpha	Gross
IVP0000392	8.95	IVP0000362	22.40	IVP0000312	10.95	IVP0000432	9.45	Scaler	Alpha	Gross
IVP0000393	8.87	IVP0000363	19.40	IVP0000313	7.08	IVP0000433	1.10	Scaler	Alpha	Gross
IVP0000394	2.02	IVP0000364	13.40	IVP0000314	10.80	IVP0000434	7.71	Scaler	Alpha	Gross
IVP0000395	1.91	IVP0000365	29.90	IVP0000315	17.50	IVP0000435	21.50	Scaler	Alpha	Gross
IVP0000396	14.40	IVP0000366	19.10	IVP0000316	10.90	IVP0000436	18.30	Scaler	Alpha	Gross
IVP0000397	11.10	IVP0000367	22.00	IVP0000317	3.73	IVP0000437	15.00	Scaler	Alpha	Gross
IVP0000398	4.49	IVP0000368	14.70	IVP0000318	1.20	IVP0000438	18.35	Scaler	Alpha	Gross
IVP0000399	24.70	IVP0000369	24.90	IVP0000319	1.34	IVP0000439	12.00	Scaler	Alpha	Gross
IVP0000400	3.69	IVP0000370	18.90	IVP0000320	8.01	IVP0000440	10.50	Scaler	Alpha	Gross
IVP0000401	7.25	IVP0000371	36.30	IVP0000321	4.66	IVP0000441	3.55	Scaler	Alpha	Gross
IVP0000402	7.50	IVP0000372	29.40	IVP0000322	11.00	IVP0000442	3.44	Scaler	Alpha	Gross
IVP0000403	31.40	IVP0000273	24.70	IVP0000323	11.50	IVP0000443	17.40	Scaler	Alpha	Gross
IVP0000404	10.70	IVP0000374	15.80	IVP0000324	7.79	IVP0000444	19.05	Scaler	Alpha	Gross
IVP0000405	14.60	IVP0000375	15.80	IVP0000325	4.68	IVP0000445	21.00	Scaler	Alpha	Gross
IVP0000406	14.60	IVP0000376	24.80	IVP0000326	18.30	IVP0000446	10.60	Scaler	Alpha	Gross
IVP0000407	4.36	IVP0000377	8.82	IVP0000327	14.90	IVP0000447	17.30	Scaler	Alpha	Gross
IVP0000408	17.60	IVP0000378	19.10	IVP0000328	8.20	IVP0000448	4.16	Scaler	Alpha	Gross
IVP0000409	4.08	IVP0000379	19.40	IVP0000329	1.34	IVP0000449	11.20	Scaler	Alpha	Gross

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements

Building 779 Cluster Independent Verification Project

Building 727 & 783, Survey Unit 727-01

DCGL	100
UNITS - dpm/100 cm ²	
Sample Data	
1.84	
1.85	
1.90	
1.91	
2.02	
2.03	
2.04	
3.69	
4.08	
4.36	
4.49	
5.05	
5.46	
7.25	
7.50	
8.87	
8.94	
8.95	
9.40	
10.70	
11.10	
14.40	
14.60	
14.60	
17.60	
17.70	
20.90	
24.70	
31.40	

Descriptive Statistics

Number of Samples	29.000
Mean	9.287
Median	7.500
Standard Deviation	7.590
CV	0.817245
Range	29.560
Minimum	1.840
Maximum	31.400
GM	6.591
GSD	2.414
Mean of LN(Data)	1.886
SD of LN(Data)	0.881
Percent > DCGL	0.000

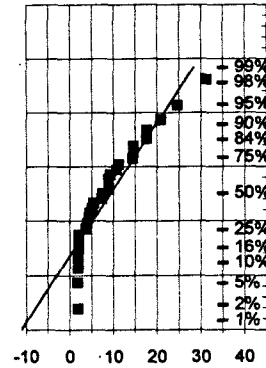
Normal Statistics

Mean	9.287
UCL(Mean) - Z	12.050
LCL(Mean) - Z	6.525
95%ile - Z	21.773
Percent > DCGL	0.000
W Test (Data)	0.869142
Normal (α=0.05)?	No

Lognormal Statistics

GM	6.591
GSD	2.414
AM of data	9.287
AM - MVUE	9.544
AM - MLE	9.717
UCL - Norm t stats	12.174
LCL - Norm t stats	6.400
UCL LogNorm t	13.585
LCL LogNorm t	6.950
UCL - Modified Cox	14.193
LCL - Modified Cox	6.418
UCL - "Exact"	
LCL - "Exact"	
95%ile	28.081
UTL 95%, 95%	47.202
Percent > DCGL	0.101
PEP (Upper)	0.739
PEP (Lower)	0.003219
W Test (ln Data)	0.928377
Lognorm (α=0.05)?	Yes

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

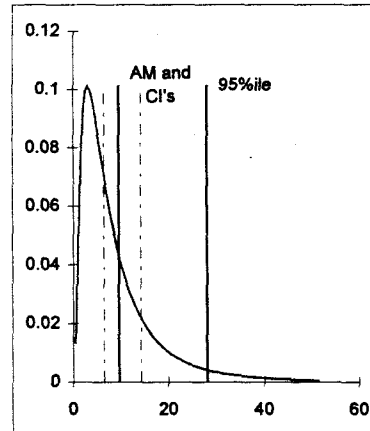
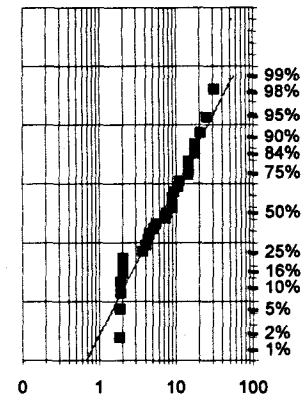


Figure 3-2. Data Evaluation Statistics—Direct Static Surface Measurements, 727-01

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements

Building 779 Cluster Independent Verification Project

Building 727 & 783, Survey Unit 727-02

DCGL 100	
UNITS - dpm/100 cm ²	
Sample Data	
8.82	
8.82	
12.30	
12.40	
13.40	
14.70	
15.70	
15.80	
15.80	
17.30	
18.90	
19.10	
19.10	
19.40	
19.40	
20.10	
20.50	
20.60	
21.10	
21.50	
21.90	
22.00	
22.40	
24.70	
24.80	
24.90	
29.40	
29.90	
36.30	
Descriptive Statistics	
Number of Samples	29.000
Mean	19.691
Median	19.400
Standard Deviation	6.092
CV	0.309383
Range	27.480
Minimum	8.820
Maximum	36.300
GM	18.754
GSD	1.386
Mean of LN(Data)	2.931
SD of LN(Data)	0.326
Percent > DCGL	0.000
Normal Statistics	
Mean	19.691
UCL(Mean) - Z	21.908
LCL(Mean) - Z	17.474
95%ile - Z	29.713
Percent > DCGL	0.000
W Test (Data)	0.964049
Normal (a=0.05)?	Yes
Lognormal Statistics	
GM	18.754
GSD	1.386
AM of data	19.691
AM - MVUE	19.743
AM - MLE	19.781
UCL - Norm t stats	22.008
LCL - Norm t stats	17.374
UCL LogNorm t	22.397
LCL LogNorm t	17.471
UCL - Modified Cox	22.430
LCL - Modified Cox	17.378
UCL - "Exact"	
LCL - "Exact"	
95%ile	32.089
UTL 95%, 95%	38.898
Percent > DCGL	0.000
PEP (Upper)	0.000
PEP (Lower)	0
W Test (ln Data)	0.95569
Lognorm (a=0.05)?	Yes

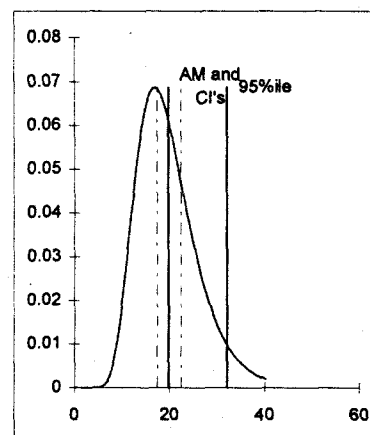
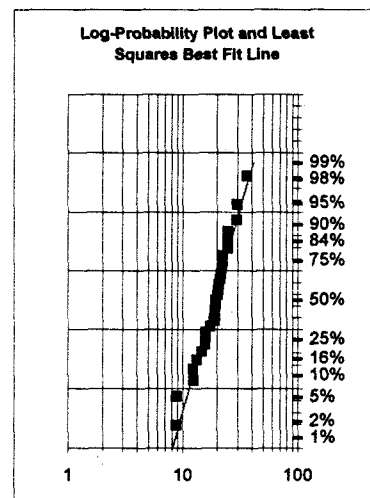
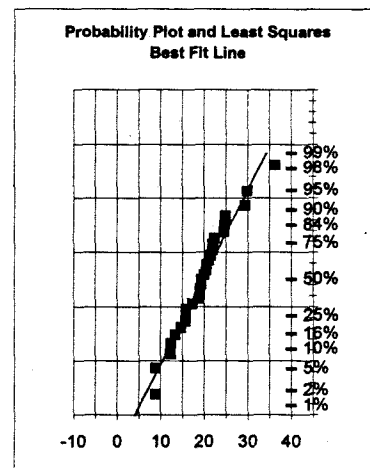


Figure 3-2 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 727-02

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements

Building 779 Cluster Independent Verification Project

Building 782, Survey Unit 782-01

DCGL	100
UNITS - dpm/100 cm ²	
Sample Data	
1.20	
1.34	
1.34	
3.73	
4.66	
4.68	
7.08	
7.36	
7.79	
8.01	
8.20	
10.80	
10.90	
10.90	
10.95	
11.00	
11.50	
12.25	
13.80	
14.10	
14.90	
17.50	
17.50	
18.30	
24.10	
24.10	
24.20	
31.10	
34.50	
Descriptive Statistics	
Number of Samples	29.000
Mean	12.682
Median	10.950
Standard Deviation	8.526
CV	0.672258
Range	33.300
Minimum	1.200
Maximum	34.500
GM	9.532
GSD	2.408
Mean of LN(Data)	2.255
SD of LN(Data)	0.879
Percent > DCGL	0.000
Normal Statistics	
Mean	12.682
UCL(Mean) - Z	15.786
LCL(Mean) - Z	9.579
95%ile - Z	26.707
Percent > DCGL	0.000
W Test (Data)	0.924105
Normal (a=0.05)?	No
Lognormal Statistics	
GM	9.532
GSD	2.408
AM of data	12.682
AM - MVUE	13.778
AM - MLE	14.025
UCL - Norm t stats	15.925
LCL - Norm t stats	9.439
UCL LogNorm t	19.593
LCL LogNorm t	10.040
UCL - Modified Cox	20.462
LCL - Modified Cox	9.277
UCL - "Exact"	
LCL - "Exact"	
95%ile	40.462
UTL 95%, 95%	67.921
Percent > DCGL	0.374
PEP (Upper)	1.810
PEP (Lower)	0.024998
W Test (ln Data)	0.898559
Lognorm (a=0.05)?	No

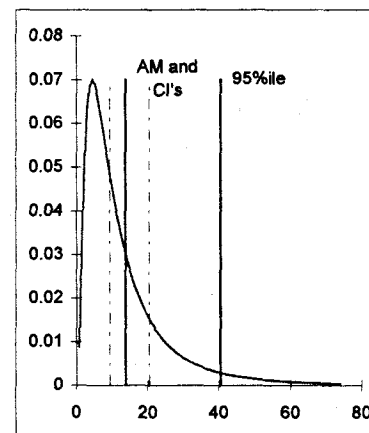
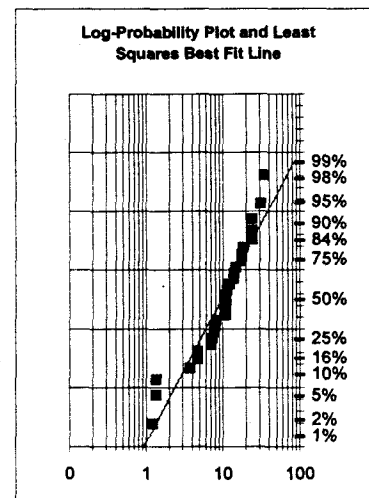
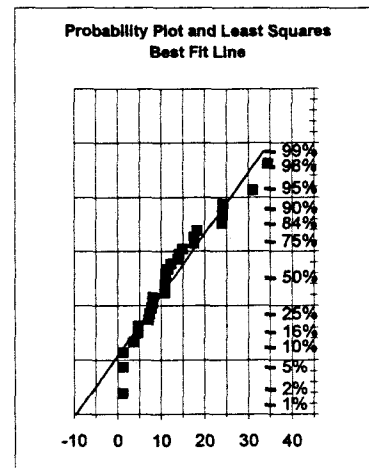


Figure 3-2 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 782-01

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements

Building 779 Cluster Independent Verification Project

Building 782, Survey Unit 782-02

DCGL	100
UNITS - dpm/100 cm ²	
Sample Data	
1.10	
3.44	
3.55	
3.96	
4.16	
6.94	
7.15	
7.23	
7.26	
7.71	
9.45	
10.40	
10.50	
10.60	
11.10	
11.20	
12.00	
14.00	
15.00	
17.30	
17.40	
17.50	
18.30	
18.35	
19.05	
20.60	
21.00	
21.50	
24.10	

Descriptive Statistics		
Number of Samples	29.000	
Mean	12.133	
Median	11.100	
Standard Deviation	6.376	
CV	0.525542	
Range	23.000	
Minimum	1.100	
Maximum	24.100	
GM	10.048	
GSD	2.032	
Mean of LN(Data)	2.307	
SD of LN(Data)	0.709	
Percent > DCGL	0.000	

Normal Statistics		
Mean	12.133	
UCL(Mean) - Z	14.453	
LCL(Mean) - Z	9.812	
95%ile - Z	22.622	
Percent > DCGL	0.000	
W Test (Data)	0.954488	
Normal (a=0.05)?	Yes	

Lognormal Statistics		
GM	10.048	
GSD	2.032	
AM of data	12.133	
AM - MVUE	12.784	
AM - MLE	12.920	
UCL - Norm t stats	14.558	
LCL - Norm t stats	9.707	
UCL LogNorm t	16.921	
LCL LogNorm t	9.866	
UCL - Modified Cox	17.306	
LCL - Modified Cox	9.444	
UCL - "Exact"		
LCL - "Exact"		
95%ile	32.261	
UTL 95%, 95%	48.999	
Percent > DCGL	0.060	
PEP (Upper)	0.515	
PEP (Lower)	0.001399	
W Test (ln Data)	0.894174	
Lognorm (a=0.05)?	No	

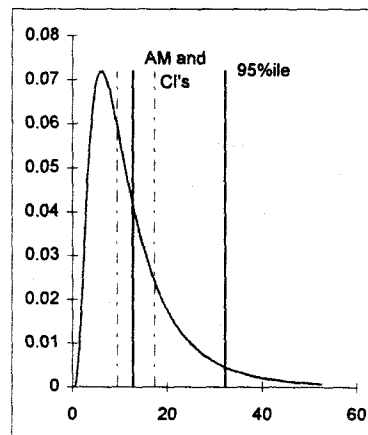
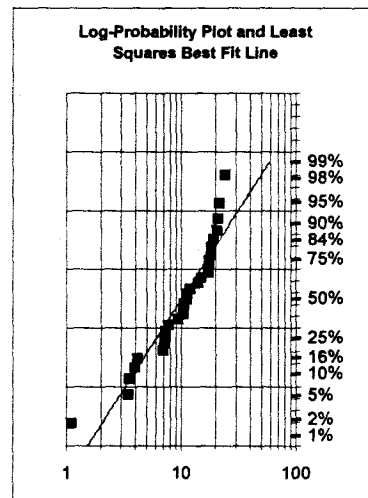
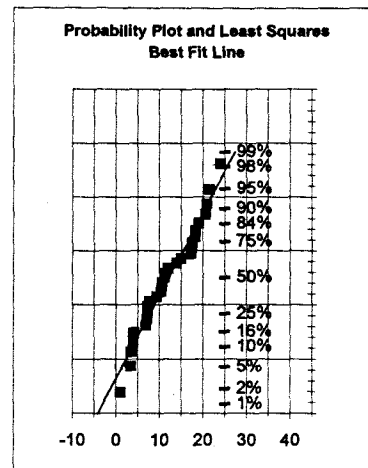


Figure 3-2 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 782-02

Table 3-5. Summary Statistics, Direct Static Measurements, Buildings 727, 782, and 783

Statistic	Survey Unit 727-01 Value	Survey Unit 727-02 Value	Survey Unit 782-01 Value	Survey Unit 782-02 Value
Number of Measurements	29	29	29	29
Arithmetic Mean	9.29	19.69	12.68	12.13
Standard Deviation (sample)	7.59	6.09	8.53	6.38
Coefficient of Variation	0.82	0.31	0.67	0.53
Max	31.4	36.3	34.5	24.1
Median	7.5	19.4	10.95	11.1
Minimum	1.84	8.82	1.2	1.1
Range	29.56	27.48	33.3	23.0
Geometric Mean	6.59	18.75	9.53	10.05
UCL (log-normal "t", a=0.05)	13.59	22.40	19.59	16.92
LCL (log-normal "t", b=0.05)	6.95	17.47	10.04	9.87

Those measurements that exceeded the critical level detection level of 22 dpm/100 cm² give some evidence of activity above background but not enough to be quantified with certainty.

The test of $DCGL_w$ for total surface contamination concentration as measured by direct surface emission is the mean (the geometric mean) since all data sets are determined to be log-normally distributed. Section 4.0 provides detailed analysis of the data sets in comparison to the applicable DCGL values.

3.1.2.1 Post Surface Media Sampling Measurements

Follow-up direct static measurements were made after each surface media sample was collected in an effort to assure that all of the contaminant, which might have been present beneath the immediate surface, was removed by the physical sampling process. This measurement was necessary to validate the assumption that any contaminant that may have been deposited beneath a paint layer or embedded in the porous substrate was limited to only shallow deposition and would be collected and measured by the surface media sampling. Evidence of elevated radioactivity by direct measurement after a thin surface veneer had been removed might call into question the validity of that assumption, requiring further investigation. The results, however, are not considered in the data set used to evaluate compliance with the $DCGL_w$ for total surface contamination as measured by direct surface emission. Nonetheless, the post surface media sampling measurements are considered important since they might detect radioactivity that is potentially "hidden" from detection by direct surface emission measurements made before removal of the surface coating or veneer.

A total of 69 surface media samples (Table 3-6) were collected from all accessible sample locations in Buildings 727, 782, and 783. A total of 71 direct static surface measurements were made at the 69 surface media sample locations subsequent to collecting surface samples. Two of these were replicate measurements collected as part of the overall QA/QC as described in the SAP. Where the replicate measurements were made, the arithmetic mean of the replicate measurement and the corresponding initial measurement was used as the reported value for the specific sample location.

Table 3-6. Post Surface Media Sample Direct Static Surface Measurements, Survey Units 727-01, 727-02, 782-01, and 782-02

Survey Unit 727-01		Survey Unit 727-02		Survey Unit 782-01		Survey Unit 782-02		Instrument Operating Mode	Channel Selected	Background Compensation Mode
Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²	Sample Location	Recorded dpm/100 cm ²			
IVP0000386	17.40	IVP0000367	20.00	IVP0000301	27.60	IVP0000421	17.30	Scaler	Alpha	Gross
IVP0000387	20.80	IVP0000368	15.10	IVP0000302	24.00	IVP0000422	3.50	Scaler	Alpha	Gross
IVP0000390	17.60	IVP0000369	25.50	IVP0000303	20.70	IVP0000423	27.30	Scaler	Alpha	Gross
IVP0000396	7.56	IVP0000370	16.30	IVP0000304	41.30	IVP0000424	31.00	Scaler	Alpha	Gross
IVP0000397	4.32	IVP0000371	29.50	IVP0000305	13.90	IVP0000426	17.30	Scaler	Alpha	Gross
IVP0000398	18.02	IVP0000372	15.70	IVP0000306	20.90	IVP0000427	5.53	Scaler	Alpha	Gross
IVP0000399	4.16	IVP0000373	14.70	IVP0000307	24.30	IVP0000430	17.20	Scaler	Alpha	Gross
IVP0000400	14.15	IVP0000374	22.60	IVP0000308	41.90	IVP0000431	17.80	Scaler	Alpha	Gross
IVP0000401	17.57	IVP0000375	9.03	IVP0000309	20.90	IVP0000432	7.63	Scaler	Alpha	Gross
IVP0000402	24.80	IVP0000376	22.00	IVP0000310	17.50	IVP0000433	14.70	Scaler	Alpha	Gross
IVP0000403	8.80	IVP0000377	8.80	IVP0000311	21.10	IVP0000434	17.90	Scaler	Alpha	Gross
IVP0000404	15.80	IVP0000378	15.80	IVP0000312	21.30	IVP0000435	18.15	Scaler	Alpha	Gross
IVP0000405	12.30	IVP0000379	12.30	IVP0000313	27.90	IVP0000436	18.20	Scaler	Alpha	Gross
IVP0000406	7.66			IVP0000314	14.20	IVP0000437	8.09	Scaler	Alpha	Gross
IVP0000407	7.71			IVP0000315	14.10	IVP0000438	4.79	Scaler	Alpha	Gross
IVP0000408	31.50			IVP0000316	7.49	IVP0000440	3.55	Scaler	Alpha	Gross
IVP0000409	25.10					IVP0000441	20.80	Scaler	Alpha	Gross
						IVP0000442	10.60	Scaler	Alpha	Gross
						IVP0000443	13.40	Scaler	Alpha	Gross
						IVP0000444	4.67	Scaler	Alpha	Gross
						IVP0000445	7.13	Scaler	Alpha	Gross
						IVP0000446	7.23	Scaler	Alpha	Gross
						IVP0000447	3.83	Scaler	Alpha	Gross

Again, a number of statistical tests of the data were performed to assess the data set. The W-test was used to measure the relative goodness of the fit of the observed data distribution. The W-test and histogram showed the survey units 727-01, 727-02, 782-01, and 782-02 data sets to be log-normally distributed. The data evaluation statistics are provided in Figure 3-3. Table 3-7 summarizes the post surface media sampling direct surface measurement data, uncorrected for background, collected in these survey units.

Table 3-7. Summary Statistics, Post Media Sampling Direct Static Measurements

Statistic	Survey Unit 727-01	Survey Unit 727-02	Survey Unit 782-01	Survey Unit 782-02
Number of Measurements	17	13	16	23
Arithmetic Mean	15.0	17.5	22.4	12.9
Standard Deviation (sample)	7.8	6.2	9.2	7.8
Coefficient of Variation	0.52	0.35	0.41	0.60
Max	31.5	29.5	41.9	31.0
Median	15.8	15.8	21.0	13.4
Minimum	4.2	8.8	7.5	3.5
Range	27.3	20.7	34.4	27.5
Geometric Mean	12.9	16.5	20.7	10.6
UCL (normal "t", $\alpha=0.05$)	21.1	22.0	28.4	17.9
LCL (normal "t", $\beta=0.05$)	11.4	14.1	18.1	9.9

The most telling presentation of the post surface media sampling surface measurements is a side by side comparison of the data set summary statistics with the summary statistics from the direct surface measurements made prior to sampling and the instrument background data collected during the sampling process. Tables 3-8, 3-9, 3-10, and 3-11 separately compare units 727-01, 727-02, 782-01, and 782-02 summary statistics from each of these three data sets.

Table 3-8. Comparison of Direct Static Measurement Data Sets Summary Statistics, Survey Unit 727-01

Statistic	Pre-Surface Media Sampling Measurements Value	Post-Surface Media Sampling Measurements Value	Background Measurements Value
Number of Measurements	29	17	12
Arithmetic Mean	9.29	15.02	6.6
Standard Deviation (sample)	7.59	7.79	2.2
Coefficient of Variation	0.82	0.52	0.34
Max	31.4	31.5	11.3
Median	7.5	15.8	6.3
Minimum	1.84	4.16	4.4
Range	29.56	27.34	6.9
Geometric Mean	6.59	12.91	6.3
UCL (log-normal "t", $\alpha=0.05$)	13.59	21.07	8.1
LCL (log-normal "t", $\beta=0.05$)	6.95	11.35	5.4

The data evaluation and summary statistics for survey unit 727-01 indicate that the post-surface media sampling direct static measurements are slightly higher than those collected prior to sampling and for background. However, the maximum activity measured during pre- and post-

DATA EVALUATION STATISTICS**Data Description**

Direct Static Surface Measurements (Post Surface Media Sampling)

Building 779 Cluster Independent Verification Project

Building 727 & 783, Survey Unit 727-01

DCGL 100	
UNITS - dpm/100 cm²	
Sample Data	
4.16	
4.32	
7.56	
7.66	
7.71	
8.80	
12.30	
14.15	
15.80	
17.40	
17.57	
17.60	
18.02	
20.80	
24.80	
25.10	
31.50	
Descriptive Statistics	
Number of Samples	17.000
Mean	15.015
Median	15.800
Standard Deviation	7.799
CV	0.519431
Range	27.340
Minimum	4.160
Maximum	31.500
GM	12.909
GSD	1.825
Mean of LN(Data)	2.558
SD of LN(Data)	0.601
Percent > DCGL	0.000
Normal Statistics	
Mean	15.015
UCL(Mean) - Z	18.722
LCL(Mean) - Z	11.307
95%ile - Z	27.844
Percent > DCGL	0.000
W Test (Data)	0.950901
Normal (a=0.05)?	Yes
Lognormal Statistics	
GM	12.909
GSD	1.825
AM of data	15.015
AM - MVUE	15.280
AM - MLE	15.468
UCL - Norm t stats	19.025
LCL - Norm t stats	11.005
UCL LogNorm t	21.073
LCL LogNorm t	11.354
UCL - Modified Cox	21.417
LCL - Modified Cox	10.902
UCL - "Exact"	
LCL - "Exact"	
95%ile	34.717
UTL 95%, 95%	57.569
Percent > DCGL	0.033
PEP (Upper)	0.606
PEP (Lower)	6.74E-05
W Test (ln Data)	0.931372
Lognorm (a=0.05)?	Yes

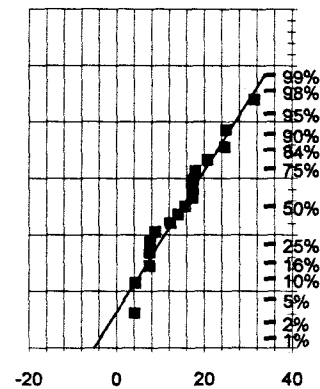
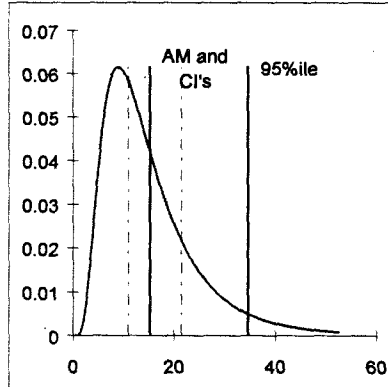
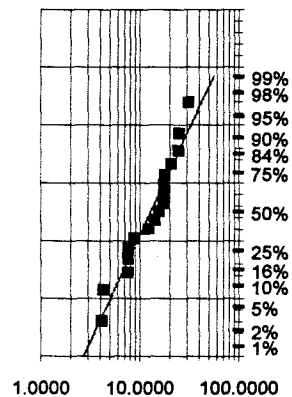
Probability Plot and Least Squares Best Fit Line**Log-Probability Plot and Least Squares Best Fit Line**

Figure 3-3. Data Evaluation Statistics—Direct Static Surface Measurements, 727-01 (Post Surface Media Sampling)

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements (Post Surface Media Sampling)

Building 779 Cluster Independent Verification Project

Building 727 & 783, Survey Unit 727-02

DCGL 100

UNITS - dpm/100 cm²

Sample Data

8.80
9.03
12.30
14.70
15.10
15.70
15.80
16.30
20.00
22.00
22.60
25.50
29.50

Descriptive Statistics

Number of Samples	13.000
Mean	17.487
Median	15.800
Standard Deviation	6.165
CV	0.352573
Range	20.700
Minimum	8.800
Maximum	29.500
GM	16.470
GSD	1.443
Mean of LN(Data)	2.802
SD of LN(Data)	0.367
Percent > DCGL	0.000

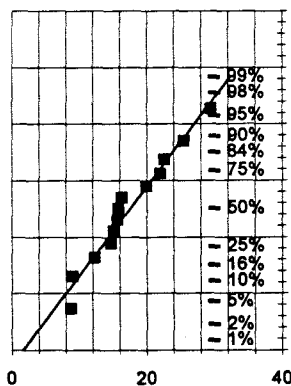
Normal Statistics

Mean	17.487
UCL(Mean) - Z	20.838
LCL(Mean) - Z	14.135
95%ile - Z	27.629
Percent > DCGL	0.000
W Test (Data)	0.954924
Normal (α=0.05)?	Yes

Lognormal Statistics

GM	16.470
GSD	1.443
AM of data	17.487
AM - MVUE	17.522
AM - MLE	17.617
UCL - Norm t stats	21.213
LCL - Norm t stats	13.761
UCL LogNorm t	21.992
LCL LogNorm t	14.113
UCL - Modified Cox	22.047
LCL - Modified Cox	13.925
UCL - "Exact"	
LCL - "Exact"	
95%ile	30.122
UTL 95%, 95%	43.880
Percent > DCGL	0.000
PEP (Upper)	0.014
PEP (Lower)	1.39E-12
W Test (ln Data)	0.954201
Lognorm (α=0.05)?	Yes

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

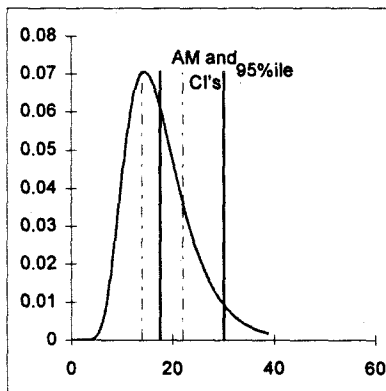
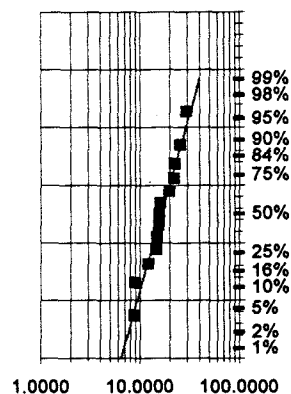


Figure 3-3 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 727-02 (Post Surface Media Sampling)

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements (Post Surface Media Sampling)

Building 779 Cluster Independent Verification Project

Building 782, Survey Unit 782-01

DCGL 100

UNITS - dpm/100 cm²

Sample Data

7.49
13.90
14.10
14.20
17.50
20.70
20.90
20.90
21.10
21.30
21.30
24.00
24.30
27.60
27.90
41.30
41.90

Descriptive Statistics

Number of Samples	16.000
Mean	22.443
Median	21.000
Standard Deviation	9.187
CV	0.409324
Range	34.410
Minimum	7.490
Maximum	41.900
GM	20.718
GSD	1.529
Mean of LN(Data)	3.031
SD of LN(Data)	0.425
Percent > DCGL	0.000

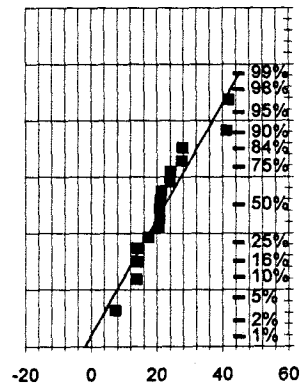
Normal Statistics

Mean	22.443
UCL(Mean) - Z	26.945
LCL(Mean) - Z	17.942
95%ile - Z	37.555
Percent > DCGL	0.000
W Test (Data)	0.90424
Normal (a=0.05)?	Yes

Lognormal Statistics

GM	20.718
GSD	1.529
AM of data	22.443
AM - MVUE	22.536
AM - MLE	22.672
UCL - Norm t stats	27.338
LCL - Norm t stats	17.548
UCL LogNorm t	28.429
LCL LogNorm t	18.081
UCL - Modified Cox	28.560
LCL - Modified Cox	17.782
UCL - "Exact"	
LCL - "Exact"	
95%ile	41.659
UTL 95%, 95%	60.483
Percent > DCGL	0.010
PEP (Upper)	0.328
PEP (Lower)	5.18E-06
W Test (ln Data)	0.938614
Lognorm (a=0.05)?	Yes

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

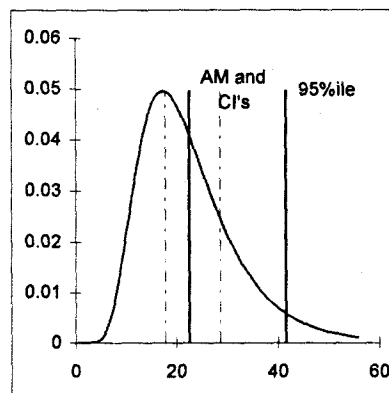
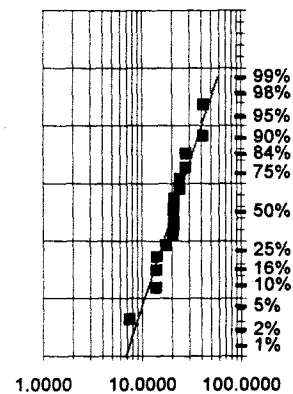


Figure 3-3 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 782-01 (Post Surface Media Sampling)

DATA EVALUATION STATISTICS

Data Description

Direct Static Surface Measurements (Post Surface Media Sampling)

Building 779 Cluster Independent Verification Project

Building 782, Survey Unit 782-02

DCGL 100

UNITS - dpm/100 cm²

Sample Data

3.50
3.55
3.83
4.67
4.79
5.53
7.13
7.23
7.63
8.09
10.60
13.40
14.70
17.20
17.30
17.30
17.80
17.90
18.15
18.20
20.80
27.30
31.00

Descriptive Statistics

Number of Samples	23.000
Mean	12.939
Median	13.400
Standard Deviation	7.776
CV	0.600959
Range	27.500
Minimum	3.500
Maximum	31.000
GM	10.589
GSD	1.974
Mean of LN(Data)	2.360
SD of LN(Data)	0.680
Percent > DCGL	0.000

Normal Statistics

Mean	12.939
UCL(Mean) - Z	16.117
LCL(Mean) - Z	9.761
95%ile - Z	25.730
Percent > DCGL	0.000
W Test (Data)	0.909892
Normal (a=0.05)?	No

Lognormal Statistics

GM	10.589
GSD	1.974
AM of data	12.939
AM - MVUE	13.184
AM - MLE	13.344
UCL - Norm t stats	16.302
LCL - Norm t stats	9.577
UCL LogNorm t	17.905
LCL LogNorm t	9.944
UCL - Modified Cox	18.296
LCL - Modified Cox	9.500
UCL - "Exact"	
LCL - "Exact"	
95%ile	32.410
UTL 95%, 95%	51.604
Percent > DCGL	0.048
PEP (Upper)	0.554
PEP (Lower)	0.00048
W Test (In Data)	0.917966
Lognorm (a=0.05)?	Yes

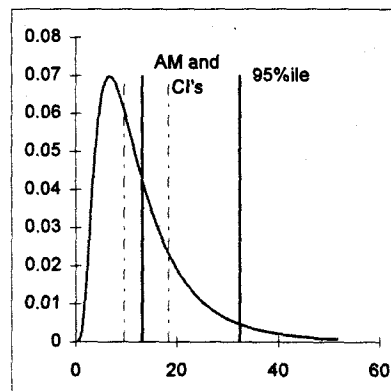
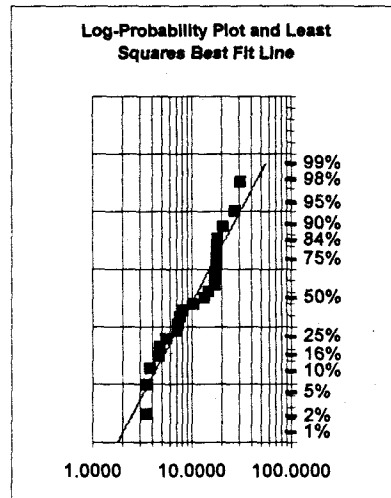
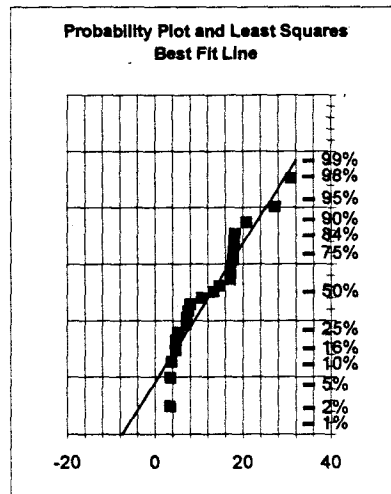


Figure 3-3 (continued). Data Evaluation Statistics—Direct Static Surface Measurements, 782-02
(Post Surface Media Sampling)

media sampling is the same. The arithmetic mean, geometric mean and median for the background and pre-media sampling measurements are virtually the same.

Table 3-9. Comparison of Direct Static Measurement Data Sets Summary Statistics, Survey Unit 727-02

Statistic	Pre-Surface Media Sampling Measurements Value	Post-Surface Media Sampling Measurements Value	Background Measurements Value
Number of Measurements	29	13	9
Arithmetic Mean	19.69	17.5	14.8
Standard Deviation (sample)	6.09	6.2	4.2
Coefficient of Variation	0.31	0.35	0.29
Max	36.3	29.5	22.5
Median	19.4	15.8	15.1
Minimum	8.82	8.8	8.5
Range	27.48	20.7	14.1
Geometric Mean	18.75	16.5	14.2
UCL (normal "t", $\alpha=0.05$)	22.40	22.0	18.7
LCL (normal "t", $\beta=0.05$)	17.47	14.1	11.8

The data evaluation and summary statistics for survey unit 727-02 indicate that there is no appreciable difference between the pre- and post-surface media sampling direct static measurements and the background.

Table 3-10. Comparison of Direct Static Measurement Data Sets Summary Statistics, Survey Unit 782-01

Statistic	Pre-Surface Media Sampling Measurements Value	Post-Surface Media Sampling Measurements Value	Background Measurements Value
Number of Measurements	29	16	12
Arithmetic Mean	12.68	22.4	7.4
Standard Deviation (sample)	8.53	9.2	5.7
Coefficient of Variation	0.67	0.41	0.77
Max	34.5	41.9	15.8
Median	10.95	21.0	4.8
Minimum	1.2	7.5	1.1
Range	33.3	34.4	14.7
Geometric Mean	9.53	20.7	5.1
UCL (normal "t", $\alpha=0.05$)	19.59	28.4	15.8
LCL (normal "t", $\beta=0.05$)	10.04	18.1	4.5

The data evaluation and summary statistics for survey unit 782-01 indicate that the post-surface media sampling direct static measurements are slightly higher than those collected prior to sampling and for background. It is also evident that the pre-media sampling measurements are also slightly higher than those of the background.

*Table 3-11. Comparison of Direct Static Measurement Data Sets Summary Statistics,
Survey Unit 782-02*

Statistic	Pre-Surface Media Sampling Measurements Value	Post-Surface Media Sampling Measurements Value	Background Measurements Value
Number of Measurements	29	23	15
Arithmetic Mean	12.13	12.9	11.7
Standard Deviation (sample)	6.38	7.8	7.2
Coefficient of Variation	0.53	0.60	0.62
Max	24.1	31.0	28.1
Median	11.1	13.4	8.3
Minimum	1.1	3.5	4.6
Range	23.0	27.5	23.5
Geometric Mean	10.05	10.6	10.0
UCL (normal "t", $\alpha=0.05$)	16.92	17.9	16.2
LCL (normal "t", $\beta=0.05$)	9.87	9.9	8.6

The data evaluation and summary statistics for survey unit 782_02 indicate that there is no appreciable difference between the pre- and post-surface media sampling direct static measurements and the background.

The fact that the data from two of the survey units yielded slightly higher direct static measurements of activity once the surface layer had been removed and that the corresponding surface media sample yielded no appreciable measure of radioactivity tends to support the possibility that the building materials have a measurable concentration of naturally occurring radionuclides¹. For sample locations where media samples were collected, both the pre- and post-surface media sampling direct static measurement data set are presented side-by-side in Table 3-12.

3.2 Laboratory Measurements

The GJO Analytical Laboratory was used to assay all smear and surface media samples collected for independent verification from survey units 727-01, 727-02, 782-01, and 782-02. The GJO Analytical Laboratory was selected because of its method capabilities, quality program, autonomy, and ability to meet the detection limits specified in the SAP (DOE 1999a). In each case, the laboratory met or exceeded the contract required detection limit specified in the SAP. Results of samples analyzed are summarized in the following sections below.

¹Although indications point to the possibility of measurable concentrations of naturally occurring radionuclides, particularly in the concrete materials used in the building construction, no credit is taken by attempting to subtract these from the measured values in the building. Instead, all radioactivity measured (other than the instrument background) is assumed to be DOE contributed values and is compared against the applicable DCGL to determine compliance with the DQOs.

Table 3-12. Direct Static Surface Measurements Data Sets, Survey Units 727-01, 727-02, 782-01, and 782-02

Survey Unit 727-01			Survey Unit 727-02			Survey Unit 782-01			Survey Unit 782-02		
Sample Location	Pre Media Sampling dpm/100 cm ²	Post Media Sampling dpm/100 cm ²	Sample Location	Pre Media Sampling dpm/100 cm ²	Post Media Sampling dpm/100 cm ²	Sample Location	Pre Media Sampling dpm/100 cm ²	Post Media Sampling dpm/100 cm ²	Sample Location	Pre Media Sampling dpm/100 cm ²	Post Media Sampling dpm/100 cm ²
IVP0000386	9.40	17.40	IVP0000367	22.00	20.00	IVP0000301	34.50	27.60	IVP0000421	10.40	17.30
IVP0000387	20.90	20.80	IVP0000368	14.70	15.10	IVP0000302	31.10	24.00	IVP0000422	24.10	3.50
IVP0000390	17.70	17.60	IVP0000369	24.90	25.50	IVP0000303	13.80	20.70	IVP0000423	20.60	27.30
IVP0000396	14.40	7.56	IVP0000370	18.90	16.30	IVP0000304	24.10	41.30	IVP0000424	6.94	31.00
IVP0000397	11.10	4.32	IVP0000371	36.30	29.50	IVP0000305	17.50	13.90	IVP0000426	14.00	17.30
IVP0000398	4.49	18.02	IVP0000372	29.40	15.70	IVP0000306	12.25	20.90	IVP0000427	3.96	5.53
IVP0000399	24.70	4.16	IVP0000373	24.70	14.70	IVP0000307	24.20	24.30	IVP0000430	7.23	17.20
IVP0000400	3.69	14.15	IVP0000374	15.80	22.60	IVP0000308	24.10	41.90	IVP0000431	11.10	17.80
IVP0000401	7.25	17.57	IVP0000375	15.80	9.03	IVP0000309	14.10	20.90	IVP0000432	9.45	7.63
IVP0000402	7.50	24.80	IVP0000376	24.80	22.00	IVP0000310	7.36	17.50	IVP0000433	1.10	14.70
IVP0000403	31.40	8.80	IVP0000377	8.82	8.80	IVP0000311	10.90	21.10	IVP0000434	7.71	17.90
IVP0000404	10.70	15.80	IVP0000378	19.10	15.80	IVP0000312	10.95	21.30	IVP0000435	21.50	18.15
IVP0000405	14.60	12.30	IVP0000379	19.40	12.30	IVP0000313	7.08	27.90	IVP0000436	18.30	18.20
IVP0000406	14.60	7.66				IVP0000314	10.80	14.20	IVP0000437	15.00	8.09
IVP0000407	4.36	7.71				IVP0000315	17.50	14.10	IVP0000438	18.35	4.79
IVP0000408	17.60	31.50				IVP0000316	10.90	7.49	IVP0000440	10.50	3.55
IVP0000409	4.08	25.10							IVP0000441	3.55	20.80
									IVP0000442	3.44	10.60
									IVP0000443	17.40	13.40
									IVP0000444	19.05	4.67
									IVP0000445	21.00	7.13
									IVP0000446	10.60	7.23
									IVP0000447	17.30	3.83

3.2.1 Smear Samples

Smear samples were collected at each of the 29 designated sample locations from each survey unit. Smear samples were collected following the initial direct static surface measurement by wiping the surface with an absorbent smear filter media using moderate pressure. The smears were packaged and delivered to the GJO Analytical Laboratory for counting. The 29 smear samples from each survey unit were submitted to the GJO Analytical Laboratory along with seven blank and five "spiked" QC smears for analysis. Table 3-13 is provided to aid the reader to keep the sample identification numbers straight. Results and conclusions relative to the quality control smear samples are provided in Section 6.0 of this report.

With the exception of the spiked QC samples submitted, the analytical results showed no measurable radioactivity indicating that there is very little likelihood that the DCGL_w for removable surface contamination might be exceeded in the survey unit. Since every sample result was below the detection limit for the analysis (MDA), no statistical inferences can be made for the data set. However, since the method detection limit was significantly below the DCGL_w for removable alpha radioactivity, and each smear sample was shown to have activity less than the detection limit, statistical treatment of the data set is not necessary in order to measure compliance. Table 3-14 summarizes the pertinent information gleaned from the complete analytical report (Requisitions 16900, 16901, and 16908). The entire analytical report is provided in Appendix C.

3.2.2 Surface Media Samples

At the request of DOE, surface media samples were collected prior to taking direct static measurements. Surface media samples were collected at locations without consideration of the trigger criteria outlined in the SAP (DOE 1999a). In all, 69 (17 from unit 727-01, 13 from unit 727-02, 16 from unit 782-01, and 23 from unit 782-02) surface media samples were collected. Since the media sample inclusion criteria for a painted or coated surface and/or exceeding the *a priori* estimate of the critical detection level of 22 dpm/100 cm² were not assessed prior to taking the media samples, samples were collected at all accessible survey locations except for those on the metal walls and roof of Building 783 and the roof of Building 782.

The walls and roof of Building 783 were constructed of galvanized steel with a thin factory coat of paint. No other paint or coating was ever applied to these surfaces. The collection of media samples from these steel surfaces was determined to be impractical since direct static measurements could quantify any significant fixed surface contamination. The roof material of Building 782 consisted of gravel stone ballast, tar, fiberboard, and 3 inches of insulation. This material was removed by the Contractor prior to the final survey. The remaining vapor barrier covering the concrete roof support was considered a bare surface. Subsequent direct static measurements of all the sample locations on the roof of Building 782 were less than 22 dpm/100 cm².

Table 3-13. Smear Sample Identification Crosswalk, Survey Units 727-01, 727-02, 782-01, and 782-02

Survey Unit 727-01				Survey Unit 727-02				Survey Unit 782-01				Survey Unit 782-02			
Field Sample Location ID#	Unique Sample ID#	Laboratory Assigned Sample #	Sample Location ID#	Unique Sample ID#	Laboratory Assigned Sample #	Field Sample Location ID#	Unique Sample ID#	Unique Sample ID#	Laboratory Assigned Sample #	Field Sample Location ID#	Unique Sample ID#	Sample Location ID#	Unique Sample ID#	Laboratory Assigned Sample #	Laboratory Assigned Sample #
IVP0000381	SMR0000381	264806	IVP0000351	SMR0000351	264838	IVP0000301	SMR0000301	SMR0000301	264945	IVP0000421	SMR0000421	IVP0000421	SMR0000421	264913	264913
IVP0000382	SMR0000382	264807	IVP0000352	SMR0000352	264839	IVP0000302	SMR0000302	SMR0000302	264946	IVP0000422	SMR0000422	IVP0000422	SMR0000422	264914	264914
IVP0000383	SMR0000383	264808	IVP0000353	SMR0000353	264840	IVP0000303	SMR0000303	SMR0000303	264947	IVP0000423	SMR0000423	IVP0000423	SMR0000423	264915	264915
IVP0000384	SMR0000384	264809	IVP0000354	SMR0000354	264841	IVP0000304	SMR0000304	SMR0000304	264948	IVP0000424	SMR0000424	IVP0000424	SMR0000424	264916	264916
IVP0000385	SMR0000385	264810	IVP0000355	SMR0000355	264842	IVP0000305	SMR0000305	SMR0000305	264949	IVP0000425	SMR0000425	IVP0000425	SMR0000425	264917	264917
IVP0000386	SMR0000386	264811	IVP0000356	SMR0000356	264843	IVP0000306	SMR0000306	SMR0000306	264950	IVP0000426	SMR0000426	IVP0000426	SMR0000426	264918	264918
IVP0000387	SMR0000387	264812	IVP0000357	SMR0000357	264844	IVP0000307	SMR0000307	SMR0000307	264951	IVP0000427	SMR0000427	IVP0000427	SMR0000427	264919	264919
IVP0000388	SMR0000388	264813	IVP0000358	SMR0000358	264845	IVP0000308	SMR0000308	SMR0000308	264952	IVP0000428	SMR0000428	IVP0000428	SMR0000428	264920	264920
IVP0000389	SMR0000389	264814	IVP0000359	SMR0000359	264846	IVP0000309	SMR0000309	SMR0000309	264953	IVP0000429	SMR0000429	IVP0000429	SMR0000429	264921	264921
IVP0000390	SMR0000390	264815	IVP0000360	SMR0000360	264847	IVP0000310	SMR0000310	SMR0000310	264954	IVP0000430	SMR0000430	IVP0000430	SMR0000430	264922	264922
IVP0000391	SMR0000391	264816	IVP0000361	SMR0000361	264848	IVP0000311	SMR0000311	SMR0000311	264955	IVP0000431	SMR0000431	IVP0000431	SMR0000431	264923	264923
IVP0000392	SMR0000392	264817	IVP0000362	SMR0000362	264849	IVP0000312	SMR0000312	SMR0000312	264956	IVP0000432	SMR0000432	IVP0000432	SMR0000432	264924	264924
IVP0000393	SMR0000393	264818	IVP0000363	SMR0000363	264850	IVP0000313	SMR0000313	SMR0000313	264957	IVP0000433	SMR0000433	IVP0000433	SMR0000433	264925	264925
IVP0000394	SMR0000394	264819	IVP0000364	SMR0000364	264851	IVP0000314	SMR0000314	SMR0000314	264958	IVP0000434	SMR0000434	IVP0000434	SMR0000434	264926	264926
IVP0000395	SMR0000395	264820	IVP0000365	SMR0000365	264852	IVP0000315	SMR0000315	SMR0000315	264959	IVP0000435	SMR0000435	IVP0000435	SMR0000435	264927	264927
IVP0000396	SMR0000396	264821	IVP0000366	SMR0000366	264853	IVP0000316	SMR0000316	SMR0000316	264960	IVP0000436	SMR0000436	IVP0000436	SMR0000436	264928	264928
IVP0000397	SMR0000397	264822	IVP0000367	SMR0000367	264854	IVP0000317	SMR0000317	SMR0000317	264961	IVP0000437	SMR0000437	IVP0000437	SMR0000437	264929	264929
IVP0000398	SMR0000398	264823	IVP0000368	SMR0000368	264855	IVP0000318	SMR0000318	SMR0000318	264962	IVP0000438	SMR0000438	IVP0000438	SMR0000438	264930	264930
IVP0000399	SMR0000399	264824	IVP0000369	SMR0000369	264856	IVP0000319	SMR0000319	SMR0000319	264963	IVP0000439	SMR0000439	IVP0000439	SMR0000439	264931	264931
IVP0000400	SMR0000400	264825	IVP0000370	SMR0000370	264857	IVP0000320	SMR0000320	SMR0000320	264964	IVP0000440	SMR0000440	IVP0000440	SMR0000440	264932	264932
IVP0000401	SMR0000401	264826	IVP0000371	SMR0000371	264858	IVP0000321	SMR0000321	SMR0000321	264965	IVP0000441	SMR0000441	IVP0000441	SMR0000441	264933	264933
IVP0000402	SMR0000402	264827	IVP0000372	SMR0000372	264859	IVP0000322	SMR0000322	SMR0000322	264966	IVP0000442	SMR0000442	IVP0000442	SMR0000442	264934	264934
IVP0000403	SMR0000403	264828	IVP0000373	SMR0000373	264860	IVP0000323	SMR0000323	SMR0000323	264967	IVP0000443	SMR0000443	IVP0000443	SMR0000443	264935	264935
IVP0000404	SMR0000404	264829	IVP0000374	SMR0000374	264861	IVP0000324	SMR0000324	SMR0000324	264968	IVP0000444	SMR0000444	IVP0000444	SMR0000444	264936	264936
IVP0000405	SMR0000405	264830	IVP0000375	SMR0000375	264862	IVP0000325	SMR0000325	SMR0000325	264969	IVP0000445	SMR0000445	IVP0000445	SMR0000445	264937	264937
IVP0000406	SMR0000406	264831	IVP0000376	SMR0000376	264863	IVP0000326	SMR0000326	SMR0000326	264970	IVP0000446	SMR0000446	IVP0000446	SMR0000446	264938	264938
IVP0000407	SMR0000407	264832	IVP0000377	SMR0000377	264864	IVP0000327	SMR0000327	SMR0000327	264971	IVP0000447	SMR0000447	IVP0000447	SMR0000447	264939	264939
IVP0000408	SMR0000408	264833	IVP0000378	SMR0000378	264865	IVP0000328	SMR0000328	SMR0000328	264972	IVP0000448	SMR0000448	IVP0000448	SMR0000448	264940	264940
IVP0000409	SMR0000409	264834	IVP0000379	SMR0000379	264866	IVP0000329	SMR0000329	SMR0000329	264973	IVP0000449	SMR0000449	IVP0000449	SMR0000449	264941	264941
QC SPIKE	SMR0000261	264835	QC BLANK	SMR0000264	264867	QC BLANK	QC BLANK	SMR0000454	264974	QC BLANK	SMR0000451	QC BLANK	SMR0000451	264942	264942
QC SPIKE	SMR0000262	264836	QC SPIKE	SMR0000265	264868	QC BLANK	QC BLANK	SMR0000455	264975	QC BLANK	SMR0000452	QC BLANK	SMR0000452	264943	264943
QC SPIKE	SMR0000263	264837	QC SPIKE	SMR0000266	264869	QC BLANK	QC BLANK	SMR0000456	264976	QC BLANK	SMR0000453	QC BLANK	SMR0000453	264945	264945

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Table 3-14. Summary of Analytical Report Data for Smears

	Survey Unit 727-01	Survey Unit 727-02
Number of Samples	29 (264806 through 264834)	29 (264838 through 264866)
Method Detection Limit ($\alpha=0.05$)	4.72 dpm/100 cm ²	4.72 dpm/100 cm ²
Removable Alpha Surface Radioactivity (dpm/100 cm ²)	All smear samples were less than (<) MDA	All smear samples were less than (<) MDA
Sample Count Time	6 minutes	6 minutes
	Survey Unit 782-01	Survey Unit 782-02
Number of Samples	29 (264945 through 264973)	29 (264913 through 264941)
Method Detection Limit ($\alpha=0.05$)	4.84 dpm/100 cm ²	4.84 dpm/100 cm ²
Removable Alpha Surface Radioactivity (dpm/100 cm ²)	All smear samples were less than (<) MDA	All smear samples were less than (<) MDA
Sample Count Time	6 minutes	6 minutes

In order to achieve the required detection sensitivity and to distinguish between transuranic and uranium series radionuclides, alpha spectroscopy analysis was chosen to assay the surface media samples. Distinction between transuranic and uranium series nuclides is important because radionuclide series specific DCGLs were established for the surface media samples. Sample masses ranged from approximately 5 to 20 grams and were collected over a 100 cm² surface area. The laboratory analyzed each sample for the following radionuclide sets:

- Transuranic Series Isotopes Pu-238, Pu-239/240, and Am-241
- Uranium Series Isotopes U-234, U-235, and U-238

In spectrometric analysis, each isotope has its own counting statistics and detection limit. Many of the sample measurements resulted in one or more of the isotope specific values below the detection limit. When this occurred, a value equal to one half of the sample specific detection limit was used to calculate the total radionuclide series activity. Collated data has been derived from the complete analytical report (Requisitions 16904, 16905, and 16906) and presented in Table 3-15. The entire analytical reports are provided in Appendix C.

From summary data presented in Table 3-15 several features are apparent:

- Isotopic assay of the contaminants found on and beneath surfaces in Buildings 727, 782, and 783 indicate the persistent presence of uranium series radionuclides. All but the three samples collected from the roof of Building 727 (fiberboard and tar) showed detectable concentrations of both of the two uranium isotopes found most abundantly in nature, U-234 and U-238. This is indicative of the presence of background contributions of these nuclides and is consistent with the background contributions expected in concrete and cinder block materials (NRC 1997).
- No clear presence of transuranic radioactivity was indicated in any of the 69 samples collected.

- The detection limit for a given isotope varied for each sample. This is due to the variation in the total sample mass collected. The laboratory was limited by the mass of sample that could efficiently be processed to extract the nuclides of interest. As a result, the laboratory fractionated a relatively consistent aliquot of the total mass submitted to actually perform the analysis. The larger the sample collected and submitted, the smaller the fraction represented by the aliquot. Thus, the detection limit increased (got poorer) as the total mass collected increased. In each case, however, actual field sampling procedure collected a sample from a 100 cm² area until the entire surface had been stripped of the paint layer or surface veneer.

Surface media sample data evaluation statistics for each survey unit is presented for the uranium series and the transuranic series in Figures 3-4 and 3-5, respectively. Table 3-16 presents the summary statistics for the surface media sample data set, with the transuranic and uranium series nuclides presented as independent subsets.

Table 3-15. Surface Media Sample Data, Buildings 727 and 783, Survey Unit 727-01—
Alpha Isotopic Analysis

Sample Location	Lab Sample ID#	Sample Weight (grams)	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
			Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	dpm/100 cm ²	dpm/100 cm ²
MED0000386	264771	11.03	0.88	0.88	1.29	0.65	1.81	0.91	31.11	1.86	0.93	30.98	2.43	63.02
MED0000387	264772	13.70	1.36	1.36	0.51	0.26	1.07	0.54	60.67	2.61	1.31	59.34	2.15	121.32
MED0000390	264773	11.08	1.45	1.45	0.82	0.41	1.11	0.56	29.24	2.26	2.26	30.58	2.42	62.08
MED0000396	264774	14.91	0.57	0.57	1.16	0.58	2.03	1.02	22.16	2.55	1.28	24.68	2.17	48.12
MED0000397	264775	15.84	1.72	1.72	1.07	0.54	1.07	0.54	26.33	1.99	1.00	26.77	2.79	54.10
MED0000398	264776	13.45	1.20	0.60	0.51	0.26	1.98	0.99	19.85	1.17	0.59	19.77	1.85	40.21
MED0000399	264777	13.74	1.44	1.44	1.00	0.50	1.00	0.50	20.26	2.15	1.08	18.08	2.44	39.42
MED0000400	264778	7.52	2.23	2.23	0.57	0.29	0.78	0.39	13.44	1.41	0.71	13.26	2.91	27.41
MED0000401	264779	3.71	0.91	0.91	0.31	0.16	1.34	1.34	3.17	0.46	0.23	3.43	2.41	6.83
MED0000402	264780	15.31	1.55	1.55	0.50	0.25	1.26	0.63	19.05	2.51	1.26	23.17	2.43	43.48
MED0000403	264781	14.57	1.49	0.75	1.15	0.58	1.56	0.78	20.18	3.15	1.58	18.90	2.10	40.66
MED0000404	264782	6.16	2.04	2.04	0.75	0.38	1.39	1.39	6.04	1.08	0.54	6.67	3.81	13.25
MED0000405	264783	11.00	0.85	0.85	0.91	0.46	1.46	0.73	12.13	1.87	0.94	14.08	2.04	27.15
MED0000406	264784	13.10	1.63	1.63	0.44	0.22	0.91	0.46	21.99	1.69	0.85	19.92	2.31	42.76
MED0000407	264785	17.59	2.68	2.68	1.74	0.87	1.97	0.99	31.75	3.11	1.56	32.05	4.54	65.36
MED0000408	264786	10.28	0.90	0.90	1.32	0.66	1.22	0.61	16.23	1.89	0.95	14.27	2.17	31.45
MED0000409	264787	11.29	1.54	1.54	1.07	0.54	1.44	0.72	19.07	1.25	0.63	15.14	2.80	34.84

Shaded cells indicate values below the detection limit. The reported value is the sample-specific MDA.

Table 3-15 (continued). Surface Media Sample Data, Buildings 727 and 783, Survey Unit 727-02—
Alpha Isotopic Analysis

Sample Location	Lab Sample ID#	Sample Weight (grams)	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
			Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	dpm/100 cm ²	dpm/100 cm ²
MED0000367	264788	17.16	2.02	2.02	0.63	0.32	2.43	1.22	42.31	2.47	2.47	37.69	3.55	82.47
MED0000368	264789	19.23	2.20	2.20	1.05	0.53	1.28	0.64	28.33	3.10	1.55	28.55	3.37	58.43
MED0000369	264790	13.04	1.05	0.53	0.46	0.23	1.34	0.67	0.75	1.63	0.82	0.74	1.43	2.31
MED0000370	264791	16.95	2.27	2.27	0.57	0.29	2.76	2.76	35.07	2.41	2.41	37.52	5.32	75.00
MED0000371	264792	11.64	1.51	1.51	0.35	0.18	1.00	0.50	23.21	1.92	0.96	24.34	2.19	48.51
MED0000372	264793	15.31	1.73	1.73	1.20	0.60	1.37	0.69	35.29	3.43	1.72	37.86	3.02	74.87
MED0000373	264794	7.01	0.59	0.30	0.61	0.31	0.54	0.27	0.43	0.84	0.42	0.43	0.87	1.28
MED0000374	264795	15.42	1.62	1.62	1.30	0.65	1.76	0.88	35.06	3.30	3.30	32.89	3.15	71.25
MED0000375	264796	13.25	4.92	4.92	0.43	0.22	3.07	3.07	18.81	1.69	0.85	18.41	8.21	38.07
MED0000376	264797	5.01	0.38	0.19	0.40	0.20	0.45	0.23	0.30	0.76	0.38	1.00	0.62	1.68
MED0000377	264798	15.08	2.53	2.53	1.69	0.85	2.11	1.06	27.94	3.20	1.60	31.02	4.43	60.56
MED0000378	264799	18.60	1.25	1.25	1.85	0.93	2.48	1.24	49.91	3.36	3.36	48.71	3.42	101.98
MED0000379	264800	15.20	1.87	1.87	0.61	0.31	1.26	0.63	33.85	2.55	1.28	32.93	2.81	68.06

Shaded cells indicate values below the detection limit. The reported value is the sample-specific MDA.

Table 3-15 (continued). Surface Media Sample Data, Building 782, Survey Unit 782-01—
Alpha Isotopic Analysis

Sample Location	Lab Sample ID#	Sample Weight (grams)	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
			Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	dpm/100 cm ²	dpm/100 cm ²
MED0000301	264870	8.07	1.20	1.20	0.35	0.18	0.39	0.20	30.61	1.92	1.92	31.96	1.57	64.49
MED0000302	264871	11.30	0.73	0.73	0.10	0.05	0.72	0.36	22.99	1.64	0.82	22.87	1.14	46.68
MED0000303	264872	11.12	0.74	0.37	0.26	0.13	0.55	0.28	25.33	1.43	1.43	27.72	0.78	54.48
MED0000304	264873	12.10	1.19	0.60	0.21	0.11	0.53	0.27	25.81	7.02	7.02	24.13	0.97	56.96
MED0000305	264874	10.47	0.66	0.33	0.16	0.08	0.26	0.13	18.08	0.92	0.46	17.25	0.54	35.79
MED0000306	264875	8.24	0.82	0.82	0.08	0.04	0.54	0.27	28.21	1.36	1.36	27.63	1.13	57.20
MED0000307	264876	13.70	2.38	2.38	0.08	0.04	0.47	0.24	26.33	0.55	0.28	27.30	2.66	53.91
MED0000308	264877	10.62	1.04	0.52	0.29	0.15	0.74	0.37	32.45	1.59	1.59	30.92	1.04	64.96
MED0000309	264878	8.18	0.70	0.70	0.15	0.08	0.26	0.13	17.89	1.18	1.18	19.37	0.91	38.44
MED0000310	264879	15.16	1.81	1.81	0.33	0.17	1.41	0.71	10.69	0.15	0.08	8.14	2.68	18.91
MED0000311	264880	9.24	1.79	1.79	0.10	0.05	0.00	0.00	21.53	2.25	2.25	19.08	1.84	42.86
MED0000312	264881	11.94	0.76	0.38	0.00	0.00	0.32	0.16	24.39	1.62	0.81	27.08	0.54	52.28
MED0000313	264882	11.11	1.20	1.20	0.21	0.11	0.57	0.29	36.84	1.38	0.69	37.13	1.59	74.66
MED0000314	264883	10.10	1.55	1.55	0.10	0.05	0.35	0.18	18.28	1.29	1.29	18.78	1.78	38.35
MED0000315	264884	9.16	0.72	0.72	0.05	0.03	0.84	0.42	32.07	1.36	1.36	32.36	1.17	65.79
MED0000316	264885	9.19	1.89	1.89	0.36	0.18	0.64	0.32	21.61	1.67	1.67	20.27	2.39	43.55
Shaded cells indicate values below the detection limit. The reported value is the sample-specific MDA.														

Table 3-15 (continued). Surface Media Sample Data, Building 782, Survey Unit 782-02—
Alpha Isotopic Analysis

Sample Location	Lab Sample ID#	Sample Weight (grams)	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
			Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	Reported Value	Reported Value (w/ samples less than MDA @ 0.5 MDA)	Reported Value	dpm/100 cm ²	dpm/100 cm ²
MED0000421	264888	10.49	0.93	0.47	0.10	0.05	0.15	0.08	19.75	1.45	1.45	22.24	0.59	43.44
MED0000422	264889	7.87	0.90	0.45	0.08	0.04	0.48	0.24	13.79	1.18	1.18	14.73	0.73	29.70
MED0000423	264890	10.61	1.09	1.09	0.14	0.07	0.92	0.46	15.48	1.37	0.69	15.05	1.62	31.22
MED0000424	264891	4.52	1.33	1.33	0.07	0.04	2.15	2.15	6.74	0.81	0.41	3.41	3.52	10.56
MED0000426	264892	2.82	0.88	0.88	0.00	0.00	0.72	0.36	2.64	0.39	0.20	2.45	1.24	5.29
MED0000427	264893	3.82	1.08	1.08	0.12	0.06	1.30	1.30	2.31	0.12	0.12	2.23	2.44	4.66
MED0000430	264894	4.49	1.88	1.88	0.07	0.04	1.03	0.52	5.24	0.07	0.04	4.15	2.43	9.43
MED0000431	264895	6.62	1.75	1.75	0.08	0.04	3.00	3.00	7.10	0.09	0.05	7.40	4.79	14.55
MED0000432	264896	8.24	0.81	0.41	0.06	0.03	0.50	0.25	15.36	2.06	2.06	14.61	0.69	32.03
MED0000433	264897	9.21	1.23	1.23	0.17	0.09	0.04	0.02	15.59	0.68	0.34	19.37	1.34	35.30
MED0000434	264898	8.15	0.48	0.24	0.03	0.02	0.72	0.36	16.33	0.92	0.46	14.82	0.62	31.61
MED0000435	264899	5.99	0.05	0.03	0.06	0.03	0.17	0.09	15.43	0.88	0.88	15.49	0.14	31.80
MED0000436	264900	11.24	1.36	1.36	0.30	0.15	0.03	0.02	40.22	1.79	0.90	38.10	1.53	79.22
MED0000437	264901	11.01	0.59	0.30	0.19	0.10	0.83	0.83	19.45	1.24	0.62	21.32	1.22	41.39
MED0000438	264902	7.97	0.65	0.33	0.09	0.05	0.03	0.02	25.96	1.89	0.95	29.11	0.39	56.02
MED0000440	264903	8.63	0.69	0.69	0.19	0.10	0.08	0.04	10.17	0.41	0.21	10.25	0.83	20.63
MED0000441	264904	6.75	0.33	0.33	0.02	0.01	0.06	0.03	9.03	1.06	1.06	9.55	0.37	19.64
MED0000442	264905	5.76	0.43	0.43	0.44	0.22	0.37	0.19	6.36	0.30	0.15	6.09	0.84	12.60
MED0000443	264906	8.97	0.79	0.40	0.02	0.01	0.32	0.16	11.75	0.80	0.40	11.98	0.57	24.13
MED0000444	264907	8.70	1.31	1.31	0.11	0.06	0.39	0.20	10.76	0.38	0.19	11.93	1.56	22.88
MED0000445	264908	8.84	1.02	1.02	0.08	0.04	0.08	0.04	10.01	0.65	0.33	8.29	1.10	18.63
MED0000446	264909	7.09	0.57	0.29	0.02	0.01	0.04	0.02	7.61	0.87	0.44	8.64	0.32	16.69
MED0000447	264910	10.25	1.22	1.22	0.21	0.11	0.21	0.11	13.09	0.34	0.17	12.93	1.43	26.19

Shaded cells indicate values below the detection limit. The reported value is the sample-specific MDA.

DATA EVALUATION STATISTICS

Data Description

Uranium Series Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Building 727 & 783, Survey Unit 727-01

DCGL 5000

Sample Data
UNITS - dpm/100 cm ²
6.83
13.25
27.15
27.41
31.45
34.84
39.42
40.21
40.66
42.76
43.48
48.12
54.10
62.08
63.02
65.36
121.32

Descriptive Statistics

Number of Samples	17.000
Mean	44.792
Median	40.660
Standard Deviation	25.504
CV	0.569401
Range	114.490
Minimum	6.830
Maximum	121.320
GM	37.987
GSD	1.908
Mean of LN(Data)	3.637
SD of LN(Data)	0.646
Percent > DCGL	0.000

Normal Statistics

Mean	44.792
UCL(Mean) - Z	56.916
LCL(Mean) - Z	32.668
95%ile - Z	86.747
Percent > DCGL	0.000
W Test (Data)	0.871687
Normal (a=0.05)?	No

Lognormal Statistics

GM	37.987
GSD	1.908
AM of data	44.792
AM - MVUE	46.136
AM - MLE	46.803
UCL - Norm t stats	57.905
LCL - Norm t stats	31.679
UCL LogNorm t	65.245
LCL LogNorm t	33.574
UCL - Modified Cox	66.604
LCL - Modified Cox	31.958
UCL - "Exact"	
LCL - "Exact"	
95%ile	109.953
UTL 95%, 95%	189.316
Percent > DCGL	0.000
PEP (Upper)	0.000
PEP (Lower)	0
W Test (ln Data)	0.903053
Lognorm (a=0.05)?	Yes

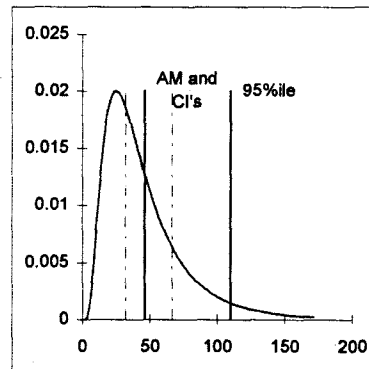
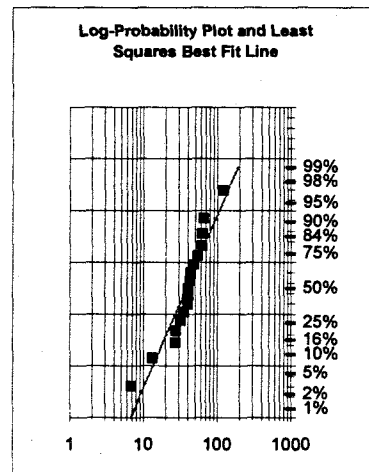
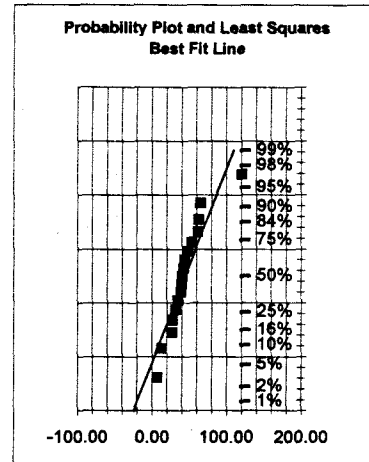


Figure 3-4. Data Evaluation Statistics—Uranium Series Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Uranium Series Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Building 727 & 783, Survey Unit 727-02

DCGL 5000

Sample Data
UNITS - dpm/100 cm ²
1.28
1.68
2.31
38.07
48.51
58.43
60.56
68.06
71.25
74.87
75.00
82.47
101.98

Descriptive Statistics

Number of Samples	13.000
Mean	52.652
Median	60.560
Standard Deviation	32.909
CV	0.625033
Range	100.700
Minimum	1.280
Maximum	101.980
GM	28.290
GSD	5.071
Mean of LN(Data)	3.343
SD of LN(Data)	1.623
Percent > DCGL	0.000

Normal Statistics

Mean	52.652
UCL(Mean) - Z	70.541
LCL(Mean) - Z	34.762
95%ile - Z	106.787
Percent > DCGL	0.000
W Test (Data)	0.891875
Normal (a=0.05)?	Yes

Lognormal Statistics

GM	28.290
GSD	5.071
AM of data	52.652
AM - MVUE	87.386
AM - MLE	105.671
UCL - Norm t stats	72.538
LCL - Norm t stats	32.765
UCL LogNorm t	281.851
LCL LogNorm t	39.618
UCL - Modified Cox	402.984
LCL - Modified Cox	18.949
UCL - "Exact"	
LCL - "Exact"	
95%ile	408.753
UTL 95%, 95%	2158.487
Percent > DCGL	0.072
PEP (Upper)	1.288
PEP (Lower)	6.41E-05
W Test (ln Data)	0.682515
Lognorm (a=0.05)?	No

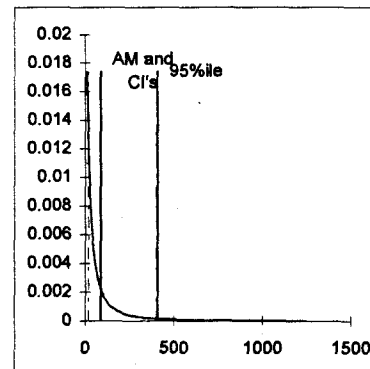
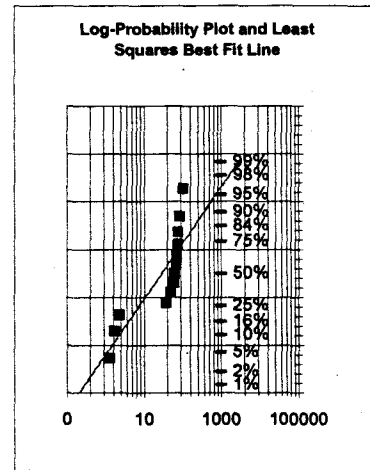
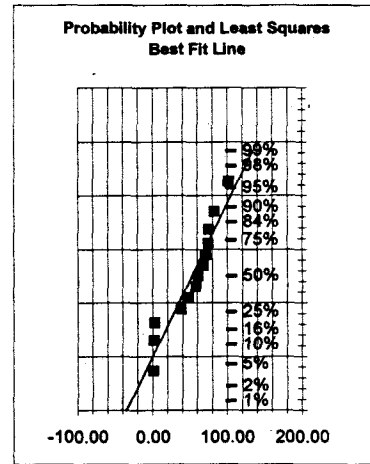


Figure 3-4 (continued). Data Evaluation Statistics—Uranium Series Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Uranium Series Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Building 782, Survey Unit 782-01

DCGL 5000

Sample Data
UNITS - dpm/100 cm ²
18.91
35.79
38.35
38.44
42.86
43.55
46.68
52.28
53.91
54.48
56.96
57.20
64.49
64.96
65.79
74.66

Descriptive Statistics

Number of Samples	16.000
Mean	50.582
Median	53.095
Standard Deviation	14.067
CV	0.278098
Range	55.750
Minimum	18.910
Maximum	74.660
GM	48.360
GSD	1.393
Mean of LN(Data)	3.879
SD of LN(Data)	0.331
Percent > DCGL	0.000

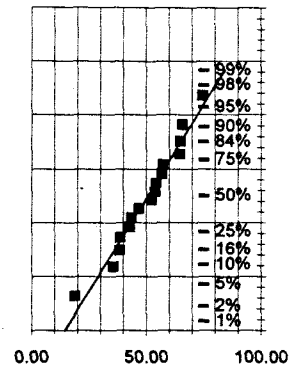
Normal Statistics

Mean	50.582
UCL(Mean) - Z	57.475
LCL(Mean) - Z	43.689
95%ile - Z	73.722
Percent > DCGL	0.000
W Test (Data)	0.972788
Normal (a=0.05)?	Yes

Lognormal Statistics

GM	48.360
GSD	1.393
AM of data	50.582
AM - MVUE	50.904
AM - MLE	51.087
UCL - Norm t stats	58.078
LCL - Norm t stats	43.086
UCL LogNorm t	60.949
LCL LogNorm t	42.821
UCL - Modified Cox	61.041
LCL - Modified Cox	42.451
UCL - "Exact"	
LCL - "Exact"	
95%ile	83.394
UTL 95%, 95%	111.544
Percent > DCGL	0.000
PEP (Upper)	
PEP (Lower)	
W Test (In Data)	0.88412
Lognorm (a=0.05)?	No

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

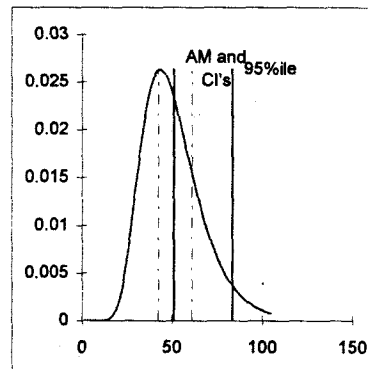
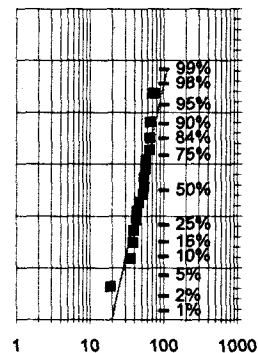


Figure 3-4 (continued). Data Evaluation Statistics—Uranium Series Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Uranium Series Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Building 782, Survey Unit 782-02

DCGL 5000

Sample Data
UNITS - dpm/100 cm ²
4.66
5.29
9.43
10.56
12.60
14.55
16.69
18.63
19.64
20.63
22.88
24.13
26.19
29.70
31.22
31.61
31.80
32.03
35.30
41.39
43.44
56.02
79.22

Descriptive Statistics

Number of Samples	23.000
Mean	26.853
Median	24.130
Standard Deviation	17.080
CV	0.636077
Range	74.560
Minimum	4.660
Maximum	79.220
GM	21.918
GSD	1.999
Mean of LN(Data)	3.087
SD of LN(Data)	0.693
Percent > DCGL	0.000

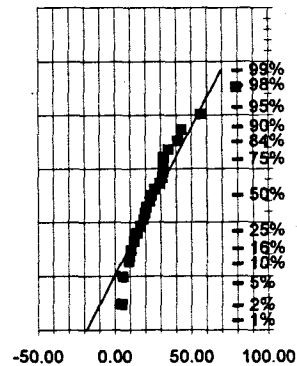
Normal Statistics

Mean	26.853
UCL(Mean) - Z	33.833
LCL(Mean) - Z	19.872
95%ile - Z	54.950
Percent > DCGL	0.000
W Test (Data)	0.900223
Normal (α=0.05)?	No

Lognormal Statistics

GM	21.918
GSD	1.999
AM of data	26.853
AM - MVUE	27.515
AM - MLE	27.864
UCL - Norm t stats	34.239
LCL - Norm t stats	19.467
UCL LogNorm t	37.597
LCL LogNorm t	20.650
UCL - Modified Cox	38.469
LCL - Modified Cox	19.681
UCL - "Exact"	
LCL - "Exact"	
95%ile	68.514
UTL 95%, 95%	110.051
Percent > DCGL	0.000
PEP (Upper)	
PEP (Lower)	
W Test (ln Data)	0.962573
Lognorm (α=0.05)?	Yes

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

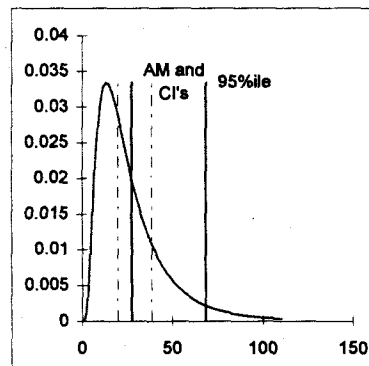
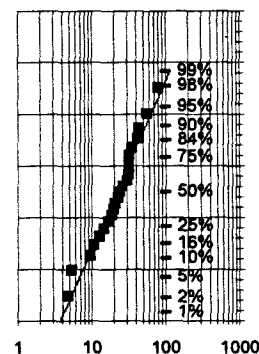


Figure 3-4 (continued). Data Evaluation Statistics—Uranium Series Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Transuranic Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Buildings 727 and 783, Survey Unit 727-01

DCGL 100

Sample Data
UNITS - dpm/100 cm ²
1.85
2.04
2.10
2.15
2.17
2.17
2.31
2.41
2.42
2.43
2.43
2.44
2.79
2.80
2.91
3.81
4.54

Descriptive Statistics

Number of Samples	17.000
Mean	2.575
Median	2.420
Standard Deviation	0.677
CV	0.262766
Range	2.690
Minimum	1.850
Maximum	4.540
GM	2.507
GSD	1.254
Mean of LN(Data)	0.919
SD of LN(Data)	0.226
Percent > DCGL	0.000

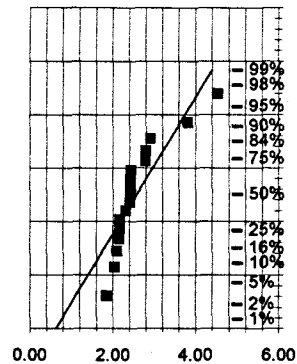
Normal Statistics

Mean	2.575
UCL(Mean) - Z	2.896
LCL(Mean) - Z	2.253
95%ile - Z	3.688
Percent > DCGL	0.000
W Test (Data)	0.776405
Normal (α=0.05)?	No

Lognormal Statistics

GM	2.507
GSD	1.254
AM of data	2.575
AM - MVUE	2.568
AM - MLE	2.572
UCL - Norm t stats	2.923
LCL - Norm t stats	2.227
UCL LogNorm t	2.889
LCL LogNorm t	2.290
UCL - Modified Cox	2.889
LCL - Modified Cox	2.283
UCL - "Exact"	
LCL - "Exact"	
95%ile	3.637
UTL 95%, 95%	4.398
Percent > DCGL	0.000
PEP (Upper)	
PEP (Lower)	
W Test (ln Data)	0.865499
Lognorm (α=0.05)?	No

Probability Plot and Least Squares
Best Fit Line



Log-Probability Plot and Least
Squares Best Fit Line

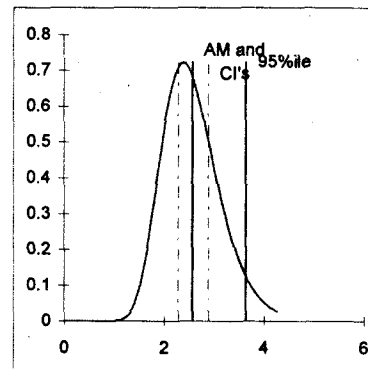
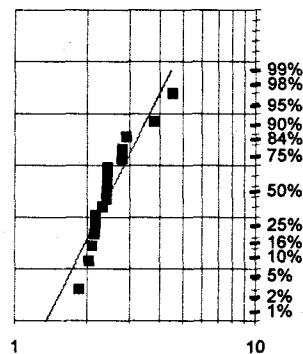


Figure 3-5. Data Evaluation Statistics—Transuranic Series Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Transuranic Activity, Surface Media Samples
 Building 779 Cluster, Independent Verification Project
 Buildings 727 and 783, Survey Unit 727-02

DCGL 100

Sample Data
UNITS - dpm/100 cm ²
0.62
0.87
1.43
2.19
2.81
3.02
3.15
3.37
3.42
3.55
4.43
5.32
8.21

Descriptive Statistics

Number of Samples	13.000
Mean	3.261
Median	3.150
Standard Deviation	1.993
CV	0.611333
Range	7.590
Minimum	0.620
Maximum	8.210
GM	2.674
GSD	2.035
Mean of LN(Data)	0.984
SD of LN(Data)	0.710
Percent > DCGL	0.000

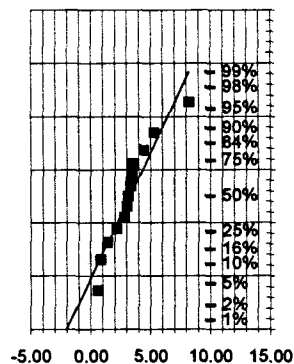
Normal Statistics

Mean	3.261
UCL(Mean) - Z	4.344
LCL(Mean) - Z	2.177
95%ile - Z	6.540
Percent > DCGL	0.000
W Test (Data)	0.910396
Normal (a=0.05)?	Yes

Lognormal Statistics

GM	2.674
GSD	2.035
AM of data	3.261
AM - MVUE	3.363
AM - MLE	3.441
UCL - Norm t stats	4.465
LCL - Norm t stats	2.056
UCL LogNorm t	5.286
LCL LogNorm t	2.240
UCL - Modified Cox	5.458
LCL - Modified Cox	2.072
UCL - "Exact"	
LCL - "Exact"	
95%ile	8.602
UTL 95%, 95%	17.814
Percent > DCGL	0.000
PEP (Upper)	0.000
PEP (Lower)	0
W Test (ln Data)	0.927231
Lognorm (a=0.05)?	Yes

Probability Plot and Least Squares Best Fit Line



Log-Probability Plot and Least Squares Best Fit Line

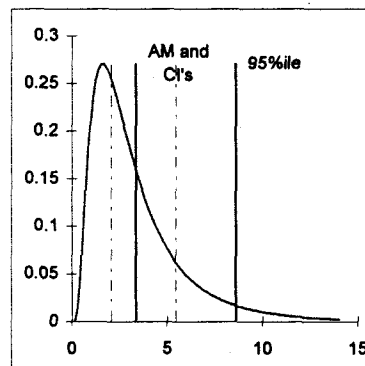
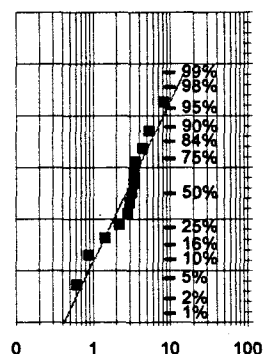


Figure 3-5 (continued). Data Evaluation Statistics—Transuranic Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Transuranic Activity, Surface Media Samples

Building 779 Cluster, Independent Verification Project

Building 782, Survey Unit 782-01

DCGL 100

Sample Data
UNITS - dpm/100 cm ²
0.54
0.54
0.78
0.91
0.97
1.04
1.13
1.14
1.17
1.57
1.59
1.78
1.84
2.39
2.66
2.68

Descriptive Statistics

Number of Samples	16.000
Mean	1.421
Median	1.155
Standard Deviation	0.693
CV	0.488157
Range	2.140
Minimum	0.540
Maximum	2.680
GM	1.267
GSD	1.655
Mean of LN(Data)	0.236
SD of LN(Data)	0.504
Percent > DCGL	0.000

Normal Statistics

Mean	1.421
UCL(Mean) - Z	1.760
LCL(Mean) - Z	1.081
95%ile - Z	2.561
Percent > DCGL	0.000
W Test (Data)	0.911903
Normal (a=0.05)?	Yes

Lognormal Statistics

GM	1.267
GSD	1.655
AM of data	1.421
AM - MVUE	1.425
AM - MLE	1.438
UCL - Norm t stats	1.790
LCL - Norm t stats	1.051
UCL LogNorm t	1.881
LCL LogNorm t	1.099
UCL - Modified Cox	1.897
LCL - Modified Cox	1.071
UCL - "Exact"	
LCL - "Exact"	
95%ile	2.901
UTL 95%, 95%	4.515
Percent > DCGL	0.000
PEP (Upper)	
PEP (Lower)	
W Test (ln Data)	0.952173
Lognorm (a=0.05)?	Yes

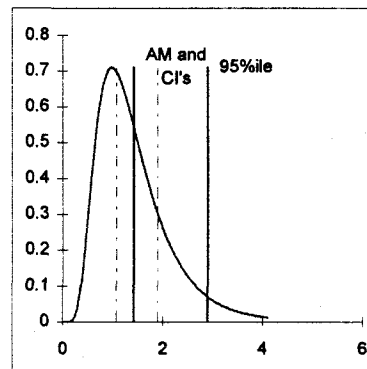
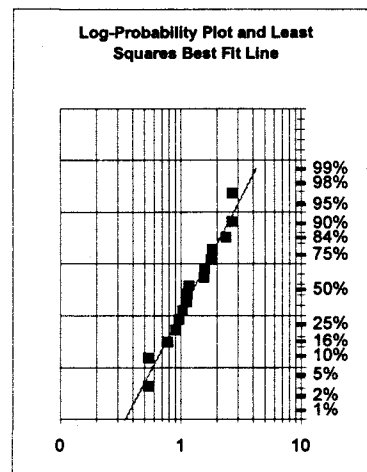
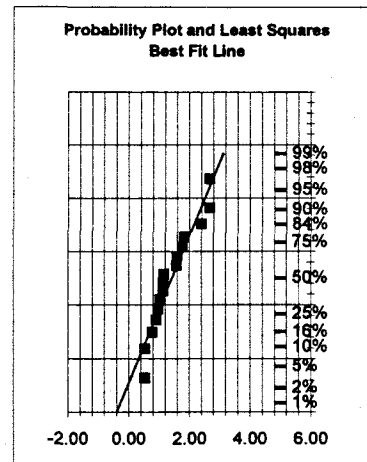


Figure 3-5 (continued). Data Evaluation Statistics—Transuranic Activity, Surface Media Samples

DATA EVALUATION STATISTICS

Data Description

Transuranic Activity, Surface Media Samples

Building 779 Cluster, Independent Verification Project

Building 782, Survey Unit 782-02

DCGL 100

Sample Data
UNITS - dpm/100 cm ²
0.14
0.32
0.37
0.39
0.57
0.59
0.62
0.69
0.73
0.83
0.84
1.10
1.22
1.24
1.34
1.43
1.53
1.56
1.62
2.43
2.44
3.52
4.79

Descriptive Statistics

Number of Samples	23.000
Mean	1.318
Median	1.100
Standard Deviation	1.100
CV	0.834347
Range	4.650
Minimum	0.140
Maximum	4.790
GM	0.977
GSD	2.264
Mean of LN(Data)	-0.023
SD of LN(Data)	0.817
Percent > DCGL	0.000

Normal Statistics

Mean	1.318
UCL(Mean) - Z	1.767
LCL(Mean) - Z	0.868
95%ile - Z	3.127
Percent > DCGL	0.000
W Test (Data)	0.816225
Normal (a=0.05)?	No

Lognormal Statistics

GM	0.977
GSD	2.264
AM of data	1.318
AM - MVUE	1.339
AM - MLE	1.364
UCL - Norm t stats	1.793
LCL - Norm t stats	0.842
UCL LogNorm t	1.942
LCL LogNorm t	0.958
UCL - Modified Cox	2.018
LCL - Modified Cox	0.888
UCL - "Exact"	
LCL - "Exact"	
95%ile	3.747
UTL 95%, 95%	6.553
Percent > DCGL	0.000
PEP (Upper)	
PEP (Lower)	
W Test (ln Data)	0.985756
Lognorm (a=0.05)?	Yes

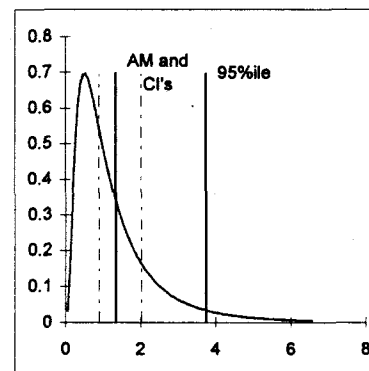
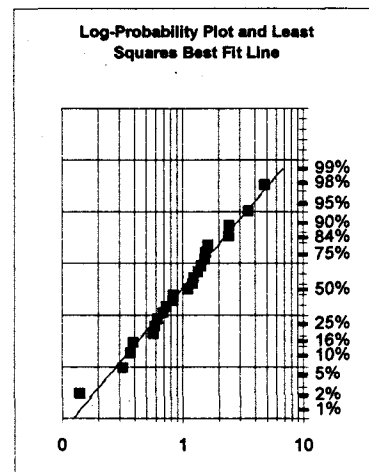
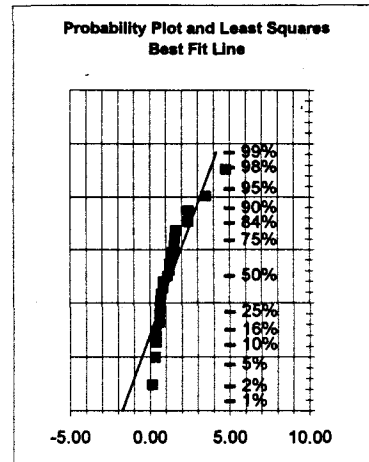


Figure 3-5 (continued). Data Evaluation Statistics—Transuranic Activity, Surface Media Samples

Table 3-16. Summary Statistics, Surface Media Samples

Statistic	Survey Unit 727-01		Survey Unit 727-02	
	Transuranic Surface Activity Value	Uranium Series Surface Activity Value	Transuranic Surface Activity Value	Uranium Series Surface Activity Value
Number of Measurements	17	17	13	13
Arithmetic Mean	2.58	44.79	3.26	52.65
Standard Deviation	0.68	25.50	1.99	32.91
Coefficient of Variation	0.26	0.57	0.61	0.63
Max	4.54	121.32	8.21	101.98
Median	2.42	40.66	3.15	60.56
Minimum	1.85	6.83	0.62	1.28
Range	2.69	114.49	7.59	100.70
Geometric Mean	2.51	37.99	2.67	28.29
UCL (log-normal "t", $\alpha=0.05$)	2.89	65.25	5.29	281.85
Statistic	Survey Unit 782-01		Survey Unit 782-02	
	Transuranic Surface Activity Value	Uranium Series Surface Activity Value	Transuranic Surface Activity Value	Uranium Series Surface Activity Value
Number of Measurements	16	16	23	23
Arithmetic Mean	1.42	50.58	1.32	26.85
Standard Deviation	0.69	14.07	1.10	17.08
Coefficient of Variation	0.49	0.28	0.83	0.64
Max	2.68	74.66	4.79	79.22
Median	1.16	53.10	1.10	24.13
Minimum	0.54	18.91	0.14	4.66
Range	2.14	55.75	4.65	74.56
Geometric Mean	1.27	48.36	0.98	21.92
UCL (log-normal "t", $\alpha=0.05$)	1.88	60.95	1.94	37.60

4.0 Analysis of Sample Plan Results for Compliance

In accordance with MARSSIM and other EPA guidance (EPA 1997) (EPA 1993), the Building 779 Cluster IV SAP identified the decision rules which provide the basis for independently verifying and assessing the RFETS Contractor's conclusions and recommendations for risk management actions in Building 779 (DOE 1999a). To accomplish this objective, the IVC was tasked with performing independent measurements of a representative fraction of the Contractor's survey, such that a statistically valid, yet independent conclusion could be drawn. In order to obtain a data set robust enough to allow statistically valid comparisons with the decision rules, the IVC selected and sampled four of the five designated survey units in Buildings 727, 782, and 783 or four of 49 designated survey units in the Building 779 Cluster. The first decision rule supports this decision objective. The IVC was also tasked with reviewing and verifying the Contractor's Closeout Radiological Survey Report and its conclusions. Since the Contractor's decision basis is applied independently to each survey unit, a sampling and statistical test with power comparable to that used by the Contractor was needed in order to compare with the conclusions reached by the Contractor. The second decision rule supports this objective. The decision rules which define compliance for the independent verification of the Building 779 Cluster surveys are specified in the IV SAP (DOE 1999a) and were reviewed by the EPA and approved by DOE and CDPHE. The IVC's SAP specifies the following two decision rules:

If the independent verification survey concludes that, in the selected survey unit(s), the mean (or median) removable surface contamination concentration is below 20 dpm/100 cm² gross alpha activity, and the mean (or median) total alpha surface contamination concentration as measured by direct surface emission is below 100 dpm/100 cm², and the maximum total alpha surface contamination concentration as measured by direct surface emission is below 300 dpm/100 cm², and the mean (or median) contamination concentration on and beneath a surface with a surface coating as measured by collection and analysis of a surface media sample is below 100 dpm/100 cm² for all transuranic nuclides combined and below 5,000 dpm/100 cm² for all uranium series nuclides combined, then conclude that the survey unit meets the release criterion.

If the IVC survey conclusion disagrees with the Contractor's final status survey conclusion, then refute the Contractor's conclusion for the survey unit and consult with the DOE-RFFO contact for direction on discrepancy resolution.

Demonstrating compliance with the decision rules for independent verification provides DOE with assurance that a substantial and credible case exists for releasing the buildings from further radioactive contamination controls during demolition or disposal.

The first decision rule forms the basis for the five DCGLs, the benchmarks against which measured values are compared to determine compliance. Each component of the decision rule can be reduced to a specific DCGL. The DCGLs for Buildings 727, 782, and 783 Closeout Radiological Survey are:

- 20 dpm/100 cm² for removable alpha surface contamination
- 100 dpm/100 cm² (mean or median) total alpha surface contamination as measured by direct surface emission

- *300 dpm/100 cm² (maximum) total alpha surface contamination as measured by direct surface emission*
- *100 dpm/100 cm² (mean or median) total transuranic surface contamination on and beneath a surface with a surface coating as measured by collection and analysis of a surface media sample*
- *5,000 dpm/100 cm² (mean or median) total uranium series surface contamination on and beneath a surface with a surface coating as measured by collection and analysis of a surface media sample*

4.1 Survey and Sampling Results Compared to the DCGLs

The following sections address each component of the sampling performed and compare the results to the applicable DCGLs. While the data sets collected by the IVC have been shown to best fit both normal and log-normal distributions, the DCGL_w values as stated by the RFETS Contractor (RMRS 1999a), do not specify whether the compliance benchmark assumes the arithmetic mean or some other estimate of central tendency appropriate to the distribution. For example, in the case of log-normally distributed data, the log-normal average (i.e., geometric mean) is a more appropriate indicator of the central tendency. When the distribution is not well known or abnormally skewed, the median value generally provides a good estimate of the central tendency for the data set. For comparison purposes in this report, the arithmetic (or normal) mean, the log-normal mean, and the median value are provided for each data set along with the maximum values observed. These provide the risk managers and decision maker with the range of plausible values that might be encountered and considerable evidence, regardless of the underlying distribution, for comparison with the DCGL benchmarks.

4.1.1 Direct Static Surface Measurements

Table 4-1 presents the gross direct static surface measurement results obtained in survey units 727-01, 727-02, 782-01, and 782-02. In this table, no correction for instrument background has been made in order to provide the risk managers and decision makers with the information needed to compare corrected and uncorrected results in the survey unit and correlate the measured residual radioactivity in the survey unit not only with the DCGL but also with the comparable measure of background.

Table 4-2 compares the background adjusted survey unit measurement results to the applicable DCGL. The background adjustment for direct static measurements is made by simply subtracting the central tendency estimate of the background measurements made over the sampling period from the comparable central tendency estimate of the gross, or unadjusted values collected and recorded in the field (see Section 3.1 for detailed discussion of background correction methods employed).

Table 4-1. Comparison of Direct Static Survey Measurements to Applicable DCGLs

Survey Units 727-01 and 727-02 Unadjusted (Gross) Measurements (dpm/100 cm ²)												
DCGL Value (Total Surface Contamination by direct surface emission)	Arithmetic Mean		Log-normal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02
100 dpm/100 cm ²	9.29	19.69	6.59	18.75	7.50	19.40	12.17	22.01	13.59	22.40		
300 dpm/100 cm ²											31.40	36.30
Survey Units 782-01 and 782-02 Unadjusted (Gross) Measurements (dpm/100 cm ²)												
DCGL Value (Total Surface Contamination by direct surface emission)	Arithmetic Mean		Log-normal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02
100 dpm/100 cm ²	12.68	12.13	9.53	10.05	10.95	11.10	15.93	14.56	19.59	16.92		
300 dpm/100 cm ²											34.50	24.10

Table 4-2. Comparison of Background Adjusted Direct Static Survey Results to Applicable DCGLs

Survey Units 727-01 and 727-02 Background Adjusted (Net) Measurements ^a (dpm/100 cm ²)												
DCGL Value (Total Surface Contamination by direct surface emission)	Arithmetic Mean		Lognormal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02
100 dpm/100 cm ²	2.69 ^b	4.92 ^b	0.31 ^b	4.52 ^b	1.22 ^b	4.30 ^b	4.16 ^b	4.00 ^b	5.45 ^b	5.74 ^b		
300 dpm/100 cm ²											20.1 ^b	13.8 ^b
Survey Units 782-01 and 782-02 Background Adjusted (Net) Measurements ^a (dpm/100 cm ²)												
DCGL Value (Total Surface Contamination by direct surface emission)	Arithmetic Mean		Log-normal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02
100 dpm/100 cm ²	5.25 ^b	0.43 ^b	4.42 ^b	0.53 ^b	6.13 ^b	2.78 ^b	4.88 ^b	-1.13 ^b	3.80 ^b	0.77 ^b		
300 dpm/100 cm ²											18.7 ^b	4.00 ^b
^a Background corrected values are provided for information. They are well below the DCGL values and just slightly above background.												
^b The following background values were used to adjust the direct static measurement values:												
	727-01	727-02	782-01	782-02								
Arithmetic Mean =	6.60	14.77	7.42	11.70								
Log-normal Geometric Mean =	6.28	14.23	5.11	9.97								
Median =	6.28	15.10	4.82	8.32								
Arithmetic UCL =	8.01	18.01	11.05	15.69								
Log-normal UCL =	8.14	16.66	15.79	16.15								
Maximum =	11.30	22.50	15.80	28.10								

From the above data, it is evident that the surface contamination as measured by direct surface emission from the building surfaces in survey units 727-01, 727-02, 782-01, and 782-02 is well below the $DCGL_W$. The IVC did not employ a scanning survey method in the independent verification sampling plan. Rather, the IVC has evaluated the scanning data collected by the Contractor to determine if the data supports the conclusions reached by the Contractor with respect to the $DCGL_{EMC}$. However, it is interesting to note the maximum concentrations measured using direct static methods as they compare to the $DCGL_{EMC}$. The maximum value measured in survey units 727-01, 727-02, 782-01, and 782-02 is substantially below the $DCGL_{EMC}$ and the background adjusted mean concentrations are significantly less. The independent verification data cannot exclude the possibility that localized concentrations of surface contamination might exist above the $DCGL_{EMC}$ value. But, given the number of measurements made, knowledge about the nature of the distribution of the data, and the large differences between the data metrics and the $DCGL_{EMC}$, it can be inferred that the likelihood of encountering even moderately sized areas with concentrations exceeding the $DCGL_{EMC}$ is small.

4.1.2 Smear Samples for Removable Surface Contamination

Smear samples are not subject to the influence of background radiation at the site, but the radiation counting instruments used to assay these samples are subject to background radiation levels at the counting laboratory and have inherent instrument backgrounds which are corrected by the laboratory processing the samples. Since the background corrections performed are not relevant to the conditions encountered in the survey units, only the background adjusted values are provided here in Table 4-3. The raw counting data can be referenced in the analytical laboratory report for the smear samples contained in Appendix C.

Table 4-3. Comparison of Smear Sample Results to Applicable $DCGL_W$.

Survey Units 727-01 and 727-02 Smear Sample Results (dpm/100 cm ²)										
DCGL Value	Arithmetic Mean		Lognormal Geometric Mean		Median		Arithmetic UCL ₉₅	Lognormal UCL ₉₅	Maximum	
	727-01	727-02	727-01	727-02	727-01	727-02			727-01	727-02
20 dpm/100 cm ² Removable Surface Contamination	<4.72	<4.72	<4.72	<4.72	<4.72	<4.72	NA	NA	<4.72	<4.72
Survey Units 782-01 and 782-02 Smear Sample Results (dpm/100 cm ²)										
DCGL Value	Arithmetic Mean		Lognormal Geometric Mean		Median		Arithmetic UCL ₉₅	Lognormal UCL ₉₅	Maximum	
	782-01	782-02	782-01	782-02	782-01	782-02			782-01	782-02
20 dpm/100 cm ² Removable Surface Contamination	<4.84	<4.84	<4.84	<4.84	<4.84	<4.84	NA	NA	<4.84	<4.84
All 58 smear samples yielded total alpha activity below the detection limit for the analysis. The method detection limit is presented for comparative information.										

From the above data, it is evident that the removable surface contamination, as measured by smear sampling of the surfaces in survey units 727-01, 727-02, 782-01, and 782-02, is well below the DCGL.

4.1.3 Surface Media Samples

As with smear samples, surface media samples are not subject to the influence of background radiation at the site, but have been corrected for the background present at the laboratory by the laboratory processing the samples. Again, since the background corrections performed are not relevant to the conditions encountered in the survey units, only the background adjusted values are provided here in Table 4-4. The raw counting data can be referenced in the analytical laboratory report for the surface media samples contained in Appendix C.

Table 4-4. Comparison of Surface Media Sample Results to Applicable DCGLs

Survey Units 727-01 and 727-02 Surface Media Sample Results (dpm/100 cm ²)												
DCGL Value	Arithmetic Mean		Log-normal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02	727-01	727-02
100 dpm/100 cm ² Total Transuranic Activity by surface media sample	2.58	3.26	2.51	2.67	2.42	3.15	2.92	4.47	2.89	5.29	4.54	8.21
5,000 dpm/100 cm ² Total Uranium Series Activity by surface media sample	44.79	52.65	37.99	28.29	40.66	60.56	57.91	72.54	65.25	281.8 5	121.3 2	101.9 8
Survey Units 782-01 and 782-02 Surface Media Sample Results (dpm/100 cm ²)												
DCGL Value	Arithmetic Mean		Log-normal Geometric Mean		Median		Arithmetic UCL ₉₅		Log-normal UCL ₉₅		Maximum	
	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02	782-01	782-02
100 dpm/100 cm ² Total Transuranic Activity by surface media sample	1.42	1.32	1.27	0.98	1.16	1.10	1.79	1.79	1.88	1.94	2.68	4.79
5,000 dpm/100 cm ² Total Uranium Series Activity by surface media sample	50.58	26.85	48.36	21.92	53.10	24.13	58.08	34.24	60.95	37.60	74.66	79.22

From the above data, it is notable that the maximum total transuranic activity contained on and in a thin veneer beneath the surface sampled is significantly below the allowable mean value. This is notable in that, as the maximum total transuranic activity collected within the entire survey unit, this measurement represents less than 5 percent of the allowable mean value. This data indicates that it is extremely unlikely that the building contains any added radioactivity and is considered safe for unrestricted release.

In fact, most of the samples measured for transuranic activity resulted in measured concentrations below the method detection limit for the analysis. Most of the transuranic activity

reported is attributed to americium-241 (Am-241) owing to interference in the energy window for Am-241 rather than americium activity. (See Appendix C for the method blank data indicating the activity showing up as Am-241 even when no americium is present.)

The total uranium series activity was consistently measured at concentrations exceeding the method detection limit even though the concentrations measured were consistently significantly below the applicable DCGL. The presence of detectable concentrations of uranium series nuclides does not, however, necessarily indicate that the activity is DOE contributed activity. In fact, isotopic ratios present in the samples support the position that the uranium series activity is naturally occurring radioactivity present in the construction materials from which the building was made. Nonetheless, because a decision was made during sampling plan design to avoid the need to make reference survey unit comparisons in order to statistically verify this assumption, all of this activity is herein assumed to be DOE contributed and is compared directly to the applicable DCGL. Even with this conservative assumption, it is clear that the residual uranium series activity on and in a thin veneer beneath the surface sampled is well below the DCGL.

4.2 Summary of Field Sampling Data

As evidenced above, each metric—the arithmetic average, logarithmic average, their respective UCL_{95} estimates and the median value—is well below the applicable $DCGL_w$ concentration value. Moreover, the maximum value for each data set is well below not only the applicable $DCGL_{EMC}$ but also below the $DCGL_w$. Based on the direct static measurements, removable smears sample results, and surface media sample results collected in the survey units selected for independent verification (727-01, 727-02, 782-01, and 782-02), there is no evidence of radiological surface contamination levels exceeding the selected DCGLs.

Thus, the first of the tests of the DQO decision rule—the *residual radioactivity must not exceed the applicable DCGLs*—has been verified.

5.0 Graphic Presentations of the Survey and Sampling Results

Graphics are a powerful and valuable tool used in reviewing the data collected. Graphic presentations—Normal Probability, Log Probability, and Probability Density Function Plots—have already been provided in Section 3.0 in support of the determination of the underlying distribution of each data set. In addition to these graphical treatments of each of the data sets collected, additional pictorial presentations are provided in Section 6.0 to assist the risk manager and decision maker in evaluating the data. Each form of graphic presentation provides a unique perspective or advantage in the data evaluation process.

5.1 Posting Plots—Spatial Contamination Distribution Graphics

Posting plots are presented for visualizing the spatial contaminant distribution within the survey unit sampled and surveyed by the IVC. Trends in spatial distribution become evident when data is plotted in this manner. The results of each data set, normalized to units of dpm/100 cm², are superimposed over the building surfaces. The walls and ceilings in the building are “unfolded” to form a contiguous surface segment, as when a cardboard box is unfolded and laid flat. Three posting plots are provided for each survey unit. One plot, (Figure 5-1) displays the 29 direct static surface contamination measurements made in survey units 727-01, 727-02, 782-01, and 782-02. The data used to generate these posting plots are “gross” measurements (not corrected for the mean background of 6.6, 14.8, 7.4, and 11.7 dpm/100 cm², respectively) to avoid negative numbers. Figures 5-2 and 5-3 display the surface media sample results from each survey unit for transuranic and uranium series activities, respectively.

The posting plots confirm that no substantial spatial trends in residual activity are present.

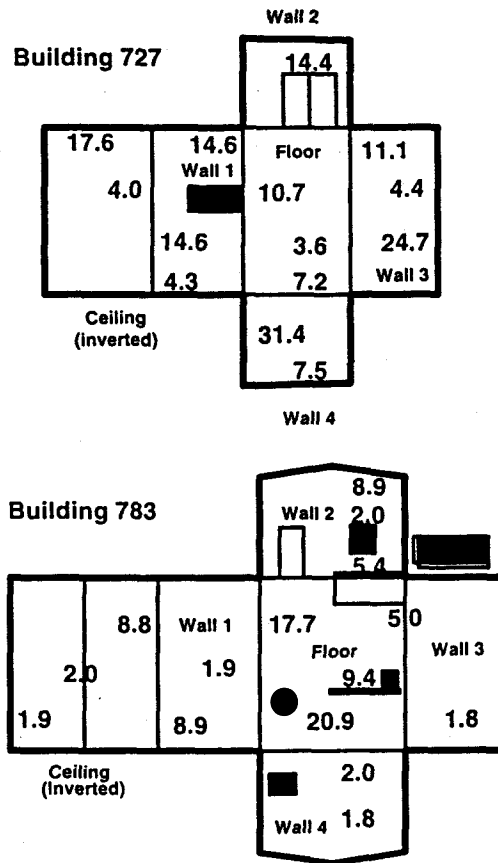
5.2 Histograms—Concentration Distribution Graphics

One of the oldest methods used for analyzing data set distributions is the histogram (or frequency plot). The data are divided into units, or bins, representing increments of activity. The data set is then sorted into these bins and the number of data points occurring in each bin (the frequency) is counted and then plotted using a bar graph. This presentation is designed to provide for visual means of assessing the symmetry and variability of the data set. When constructed correctly, the histogram will indicate if the data are skewed and will show the direction of skewness (EPA 1998). Figures 5-4, 5-5, 5-6, 5-7, and 5-8 display the histograms (technically frequency plots) for the background, direct static surface measurement, post-surface media sampling direct static surface measurement, surface media samples for transuranics, and surface media samples for uranium data sets, respectively from each survey unit.

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 727-01 MAP 1 OF 1



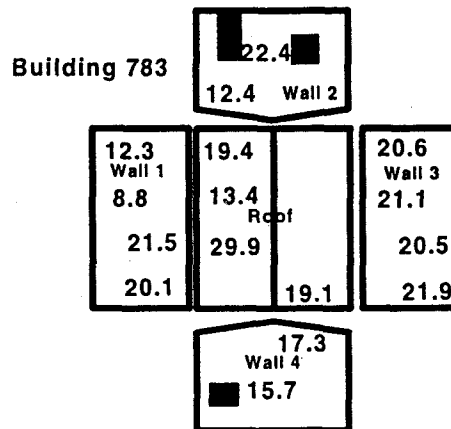
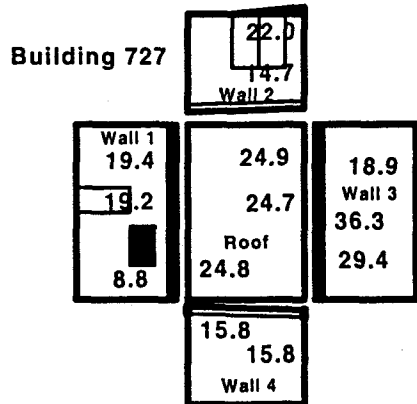
All values "gross" activity in units of dpm/100 cm²

Figure 5-1. Posting Plot—Direct Static Surface Contamination Measurements

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 727-02 MAP 1 OF 1



All values "gross" activity in units of dpm/100 cm2

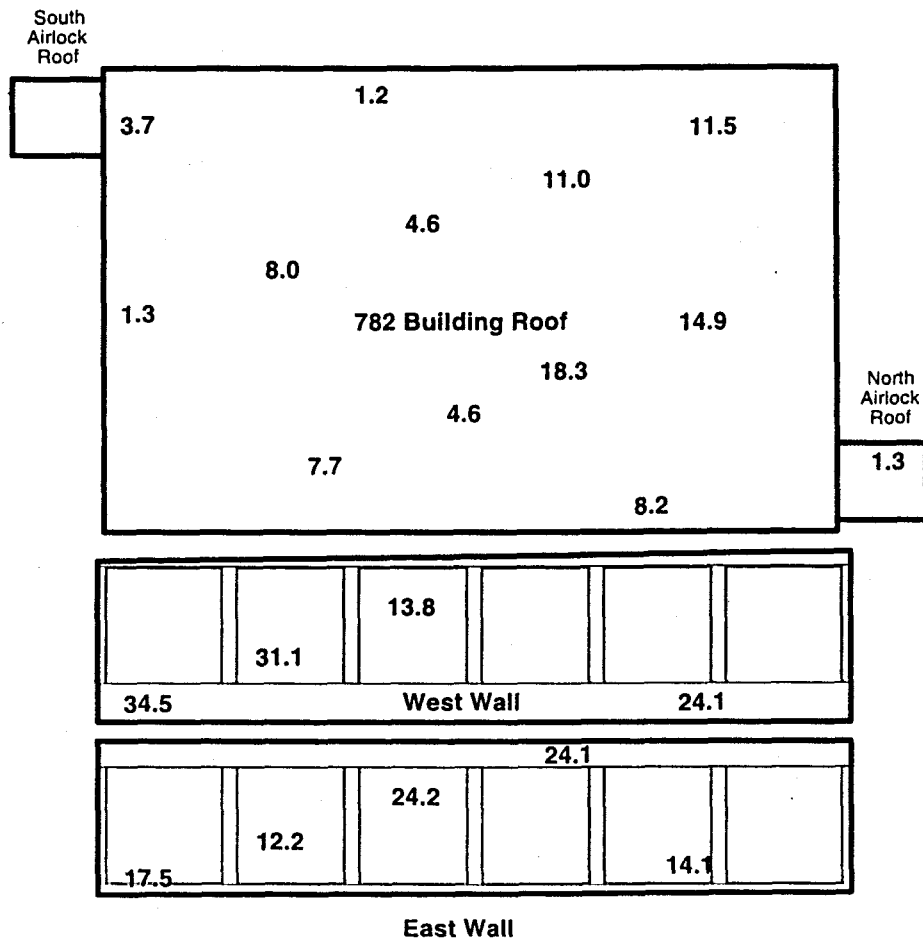
Figure 5-1 (continued). Posting Plot—Direct Static Surface Contamination Measurements

85

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 782-01 MAP 1 OF 2



All values "gross" activity in units of dpm/100 cm²

Figure 5-1 (continued). Posting Plot—Direct Static Surface Contamination Measurements

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 782-01 MAP 2 OF 2



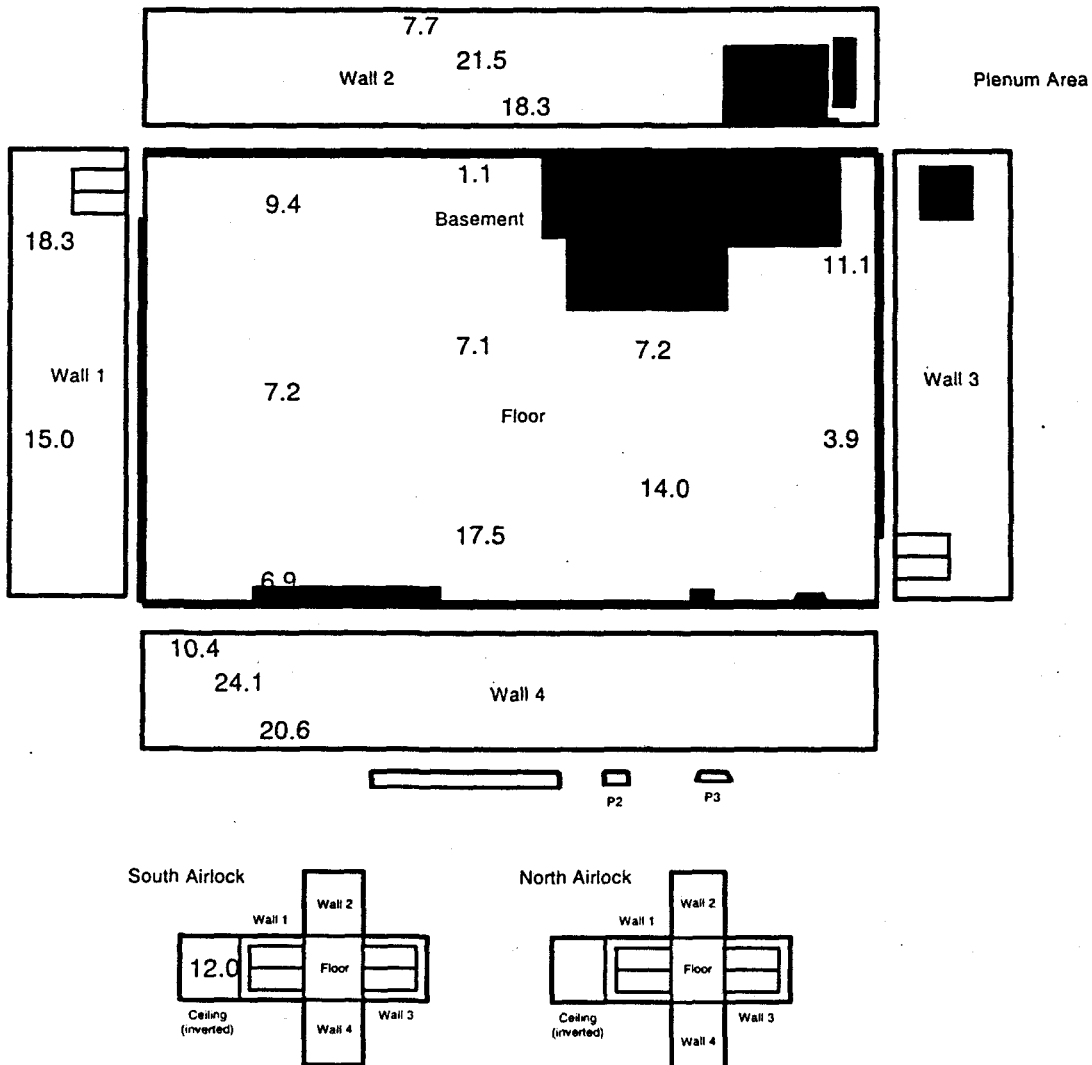
All values "gross" activity in units of dpm/100 cm²

Figure 5-1 (continued). Posting Plot—Direct Static Surface Contamination Measurements

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 782-02 MAP 1 OF 2



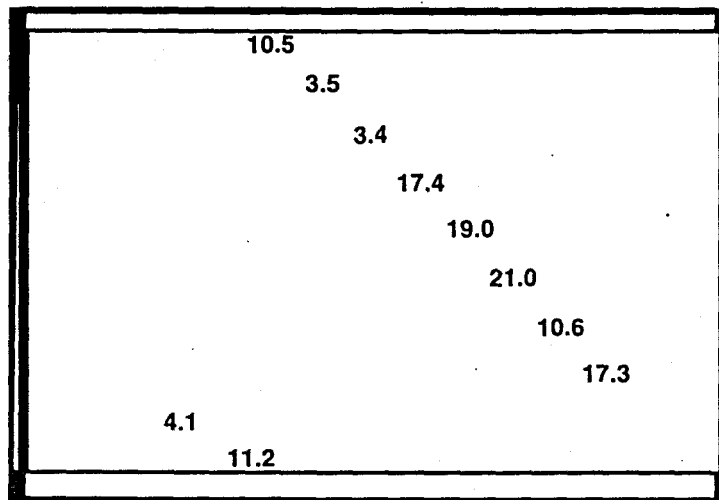
All values "gross" activity in units of dpm/100 cm²

Figure 5-1 (continued). Posting Plot—Direct Static Surface Contamination Measurements

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Direct Static Measurements

SURVEY UNIT 782-02 MAP 2 OF 2



Plenum Area Ceiling
(inverted)

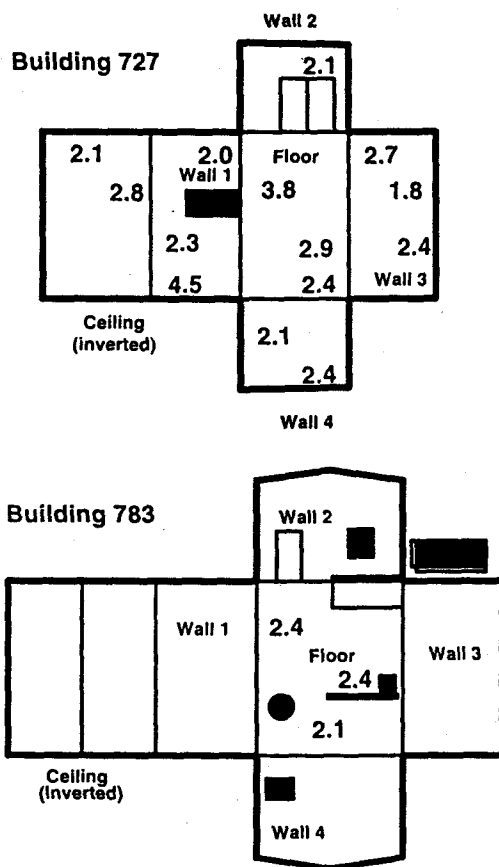
All values "gross" activity in units of dpm/100 cm2

Figure 5-1 (continued). Posting Plot—Direct Static Surface Contamination Measurements

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 727-01 MAP 1 OF 1



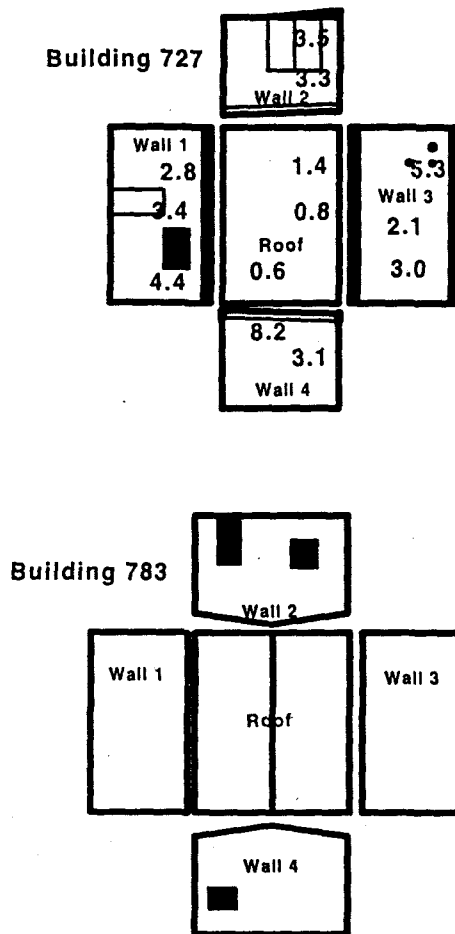
All values "gross" activity in units of dpm/100 cm2

Figure 5-2. Posting Plot—Surface Media Samples, Transuranic Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 727-02 MAP 1 OF 1



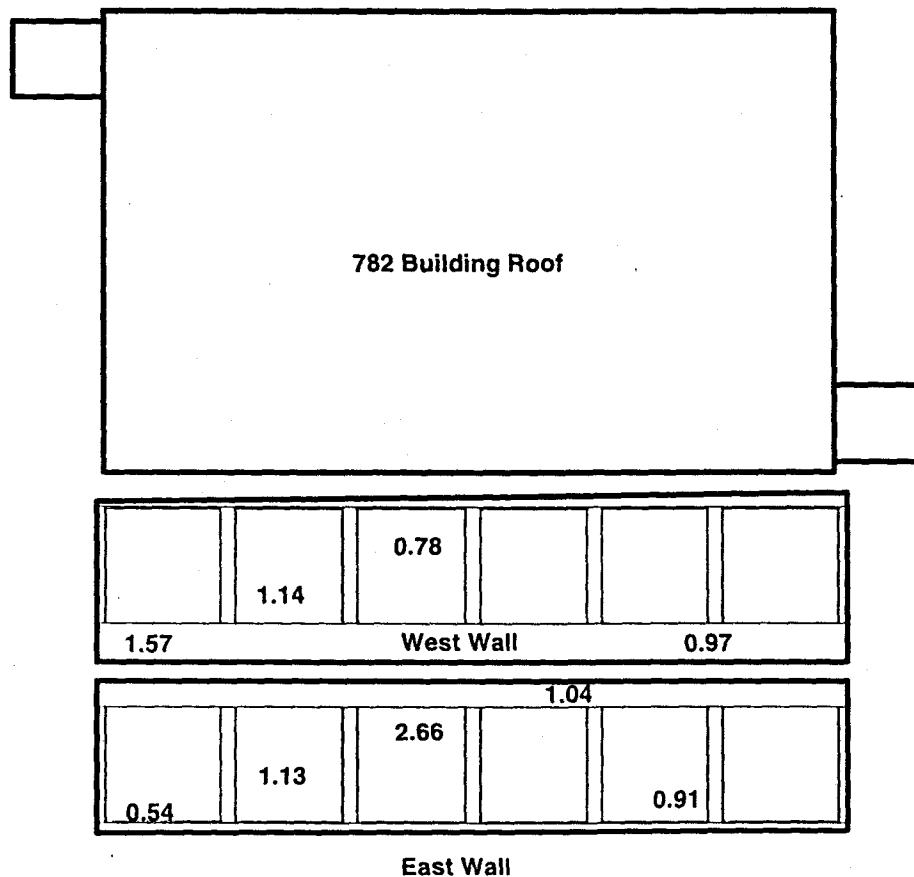
All values "gross" activity in units of dpm/100 cm²

Figure 5-2 (continued). Posting Plot—Surface Media Samples, Transuranic Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 782-01 MAP 1 OF 2



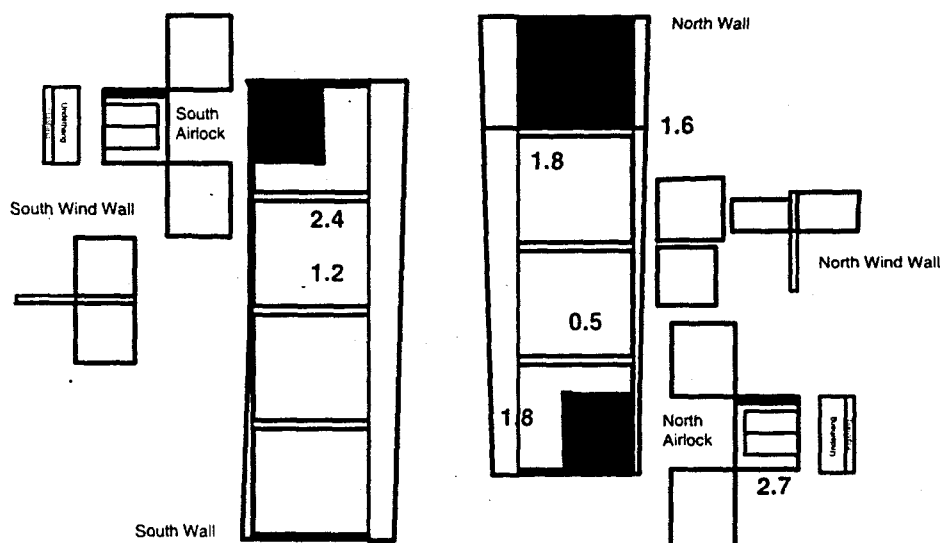
All values "gross" activity in units of dpm/100 cm²

Figure 5-2 (continued). Posting Plot—Surface Media Samples, Transuranic Activity

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 782-01 MAP 2 OF 2



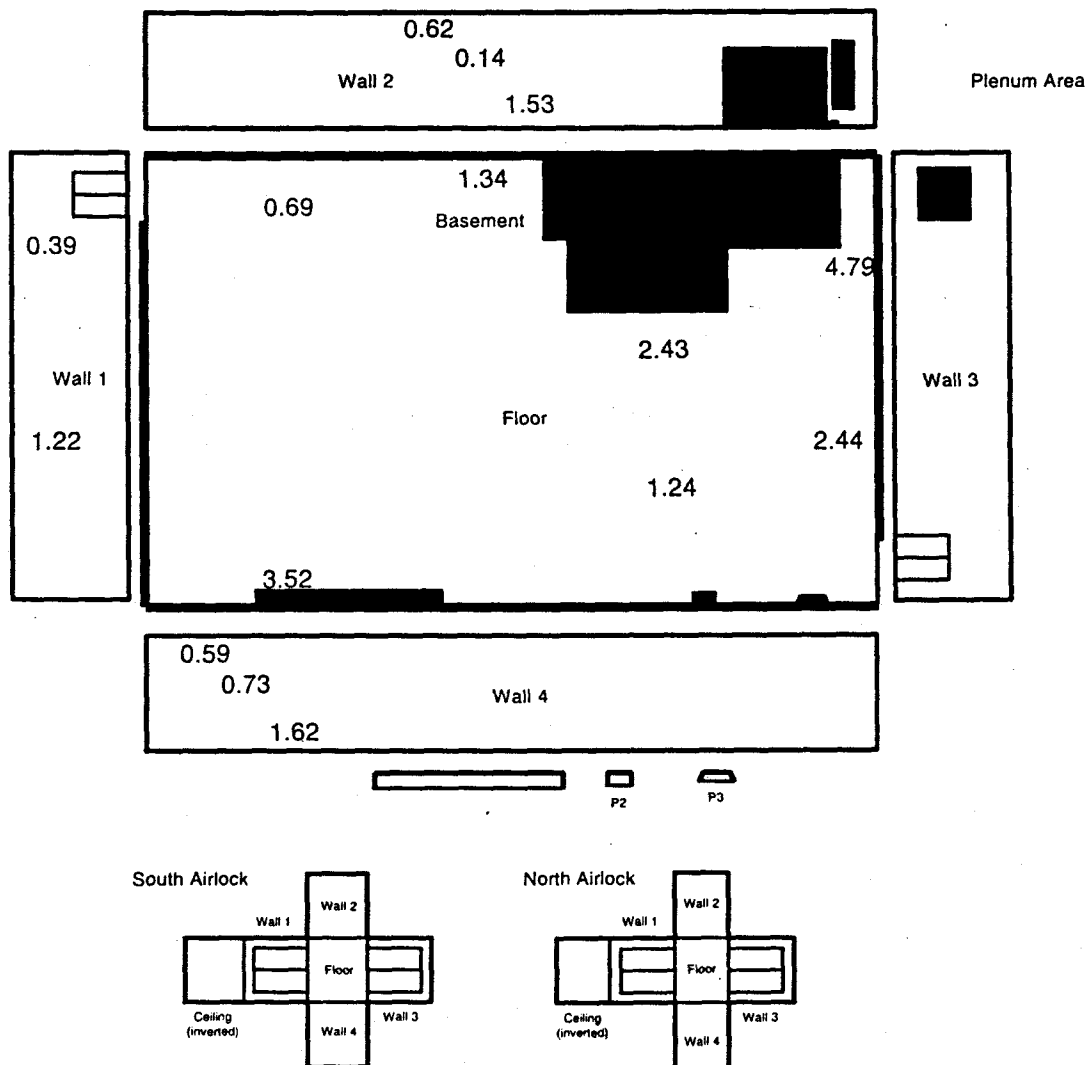
All values "gross" activity in units of dpm/100 cm²

Figure 5-2 (continued). Posting Plot—Surface Media Samples, Transuranic Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 782-02 MAP 1 OF 2



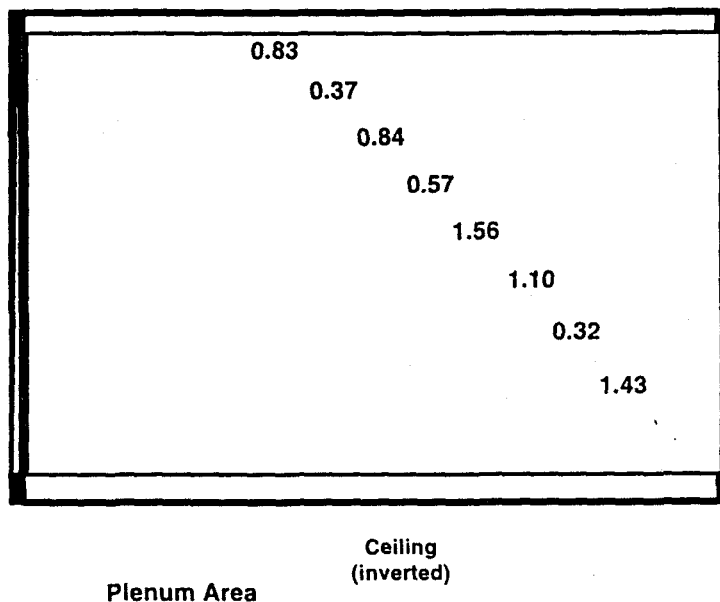
All values "gross" activity in units of dpm/100 cm²

Figure 5-2 (continued). Posting Plot—Surface Media Samples, Transuranic Activity

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN

Posting Plot: Surface Media Samples, Transuranic

SURVEY UNIT 782-02 MAP 2 OF 2



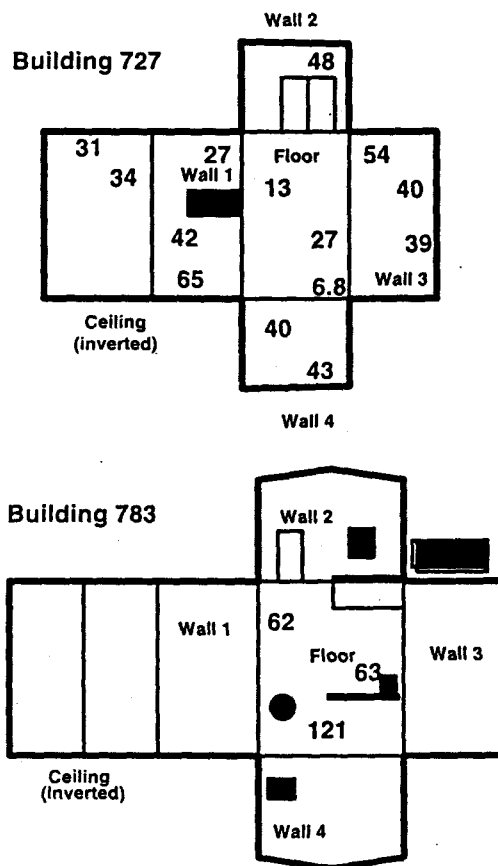
All values "gross" activity in units of dpm/100 cm²

Figure 5-2 (continued). Posting Plot—Surface Media Samples, Transuranic Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Uranium

SURVEY UNIT 727-01 MAP 1 OF 1



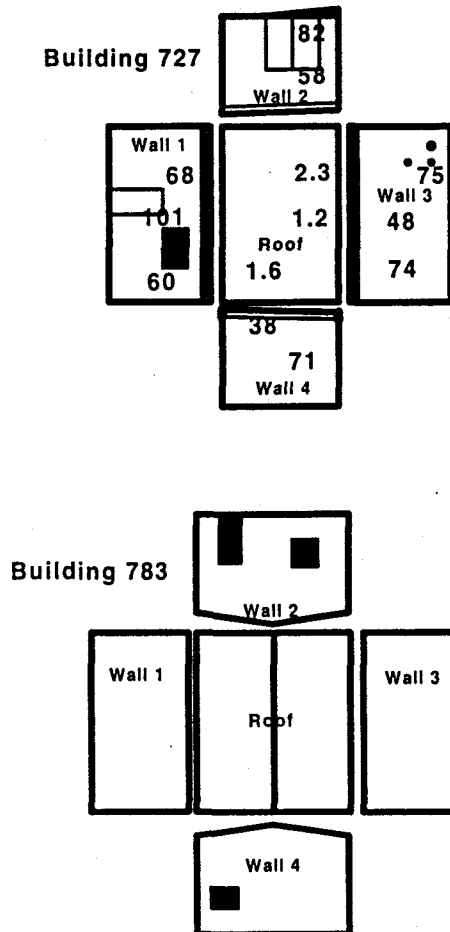
All values "gross" activity in units of dpm/100 cm²

Figure 5-3. Posting Plot—Surface Media Samples, Uranium Series Activity

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN

Posting Plot: Surface Media Samples, Uranium

SURVEY UNIT 727-02 MAP 1 OF 1



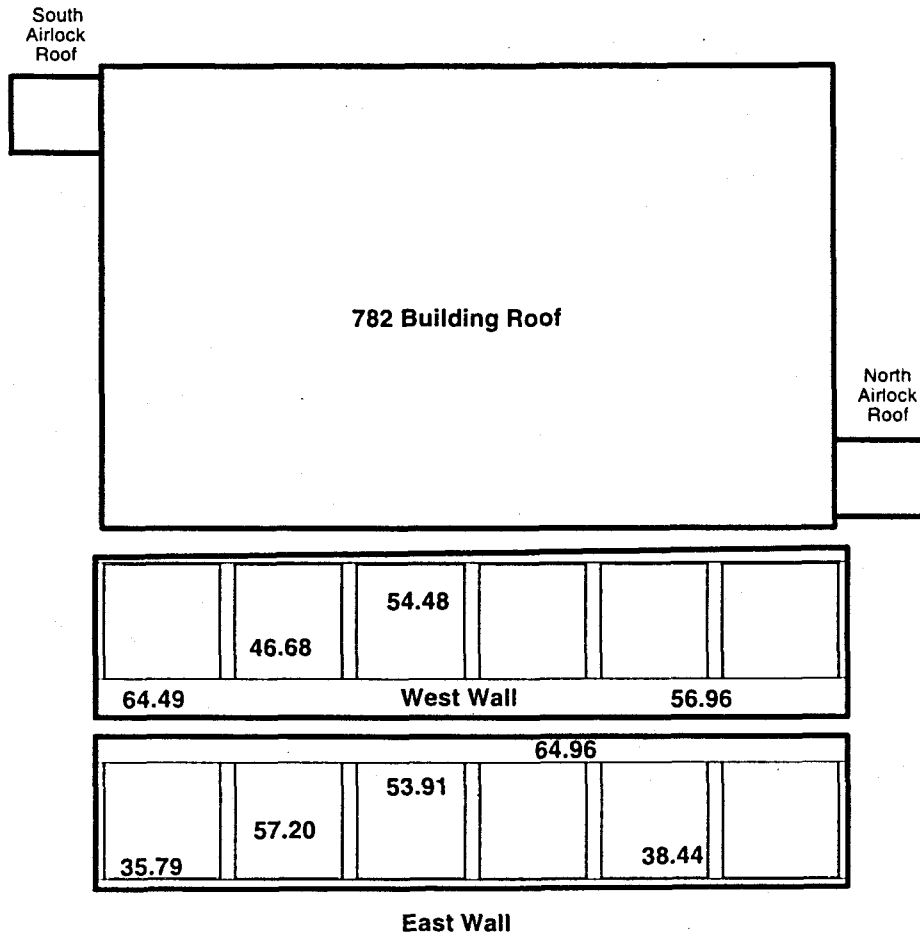
All values "gross" activity in units of dpm/100 cm²

Figure 5-3 (continued). Posting Plot—Surface Media Samples, Uranium Series Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Uranium

SURVEY UNIT 782-01 MAP 1 OF 2



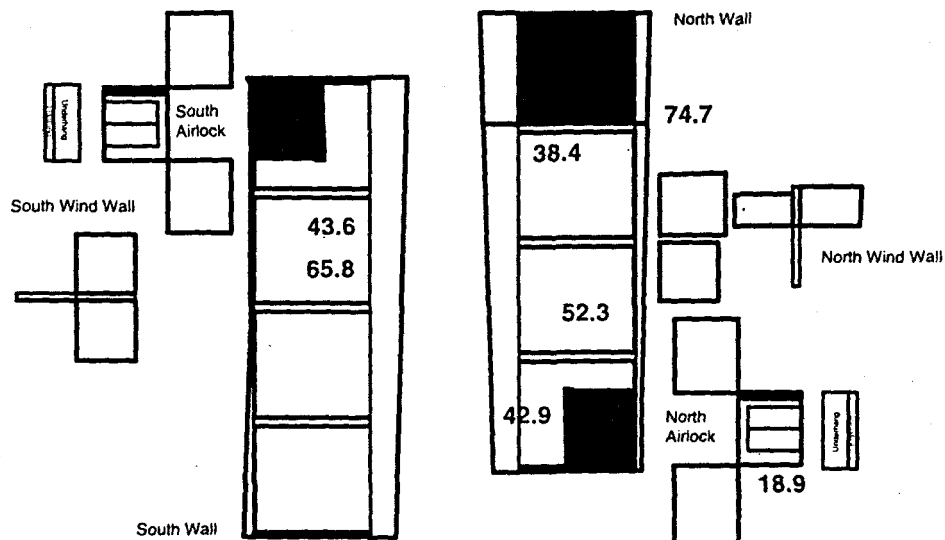
All values "gross" activity in units of dpm/100 cm2

Figure 5-3 (continued). Posting Plot—Surface Media Samples, Uranium Series Activity

**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Uranium

SURVEY UNIT 782-01 MAP 2 OF 2



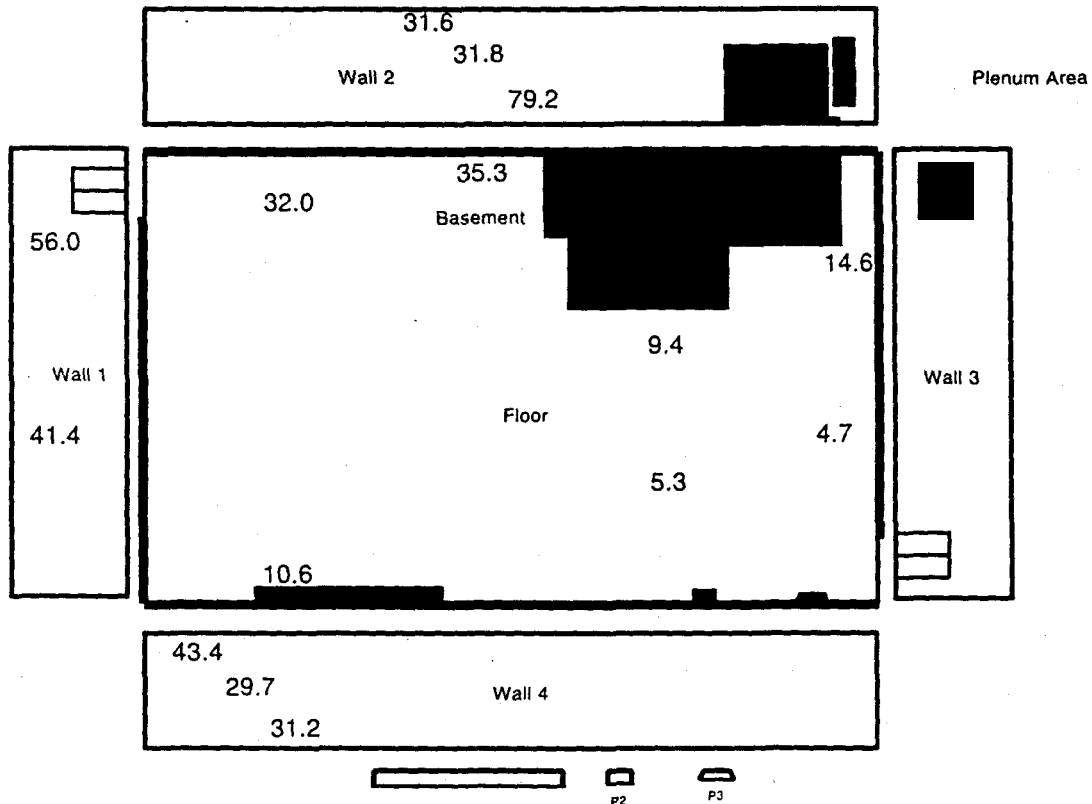
All values "gross" activity in units of dpm/100 cm²

Figure 5-3 (continued). Posting Plot—Surface Media Samples, Uranium Series Activity

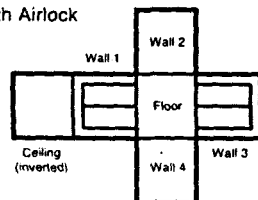
**INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN**

Posting Plot: Surface Media Samples, Uranium

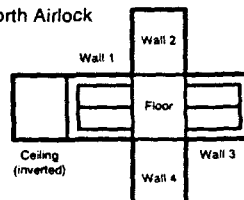
SURVEY UNIT 782-02 MAP 1 OF 2



South Airlock



North Airlock



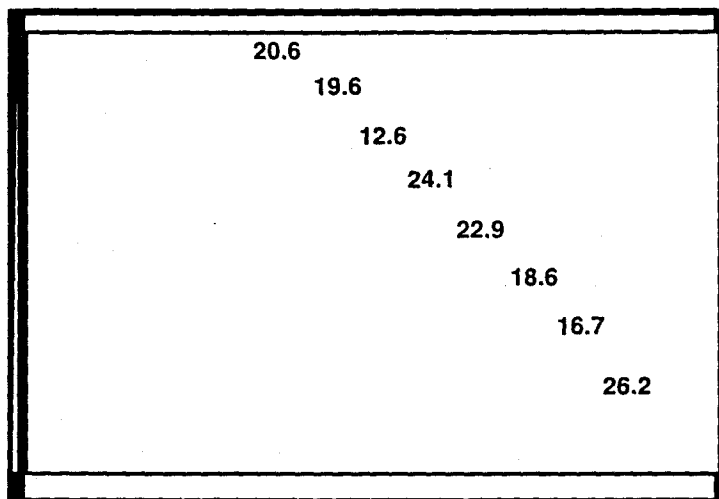
All values "gross" activity in units of dpm/100 cm²

Figure 5-3 (continued). Posting Plot—Surface Media Samples, Uranium Series Activity

INDEPENDENT VERIFICATION FOR THE BUILDING 779 CLUSTER
SURVEY UNIT SAMPLE PLAN

Posting Plot: Surface Media Samples, Uranium

SURVEY UNIT 782-02 MAP 2 OF 2



Plenum Area

Ceiling
(inverted)

All values "gross" activity in units of dpm/100 cm²

Figure 5-3 (continued). Posting Plot—Surface Media Samples, Uranium Series Activity

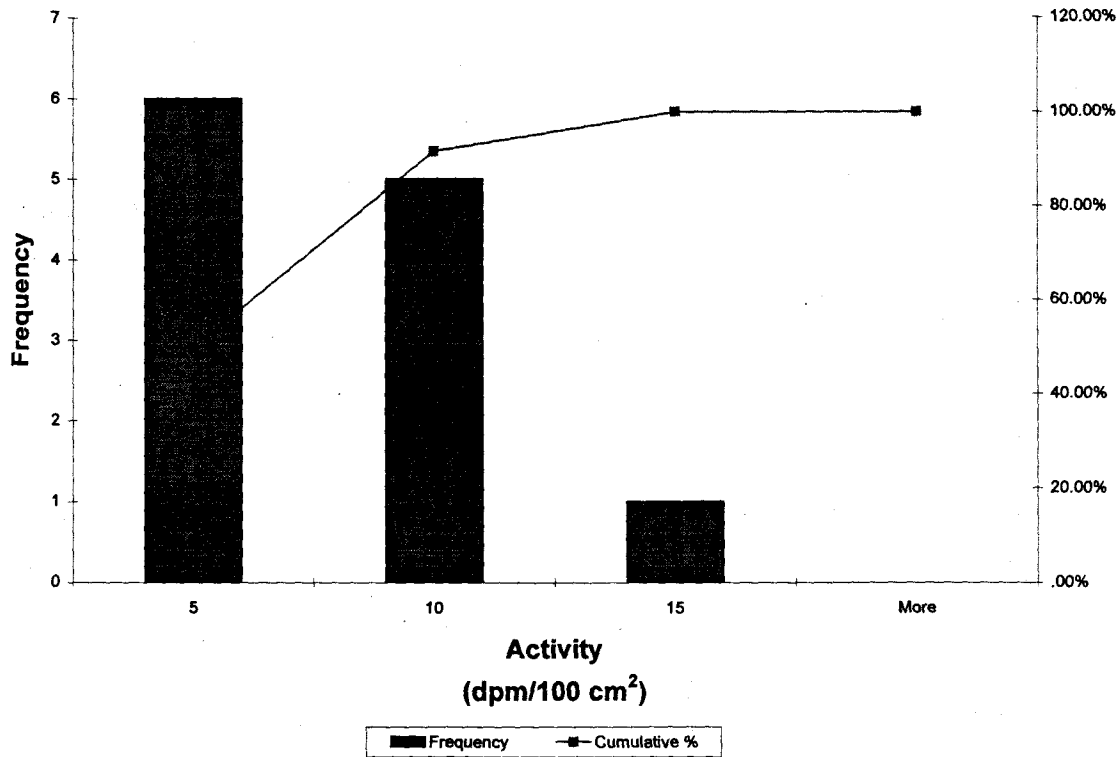


Figure 5-4. Histogram—Instrument Background Measurements, 727-01

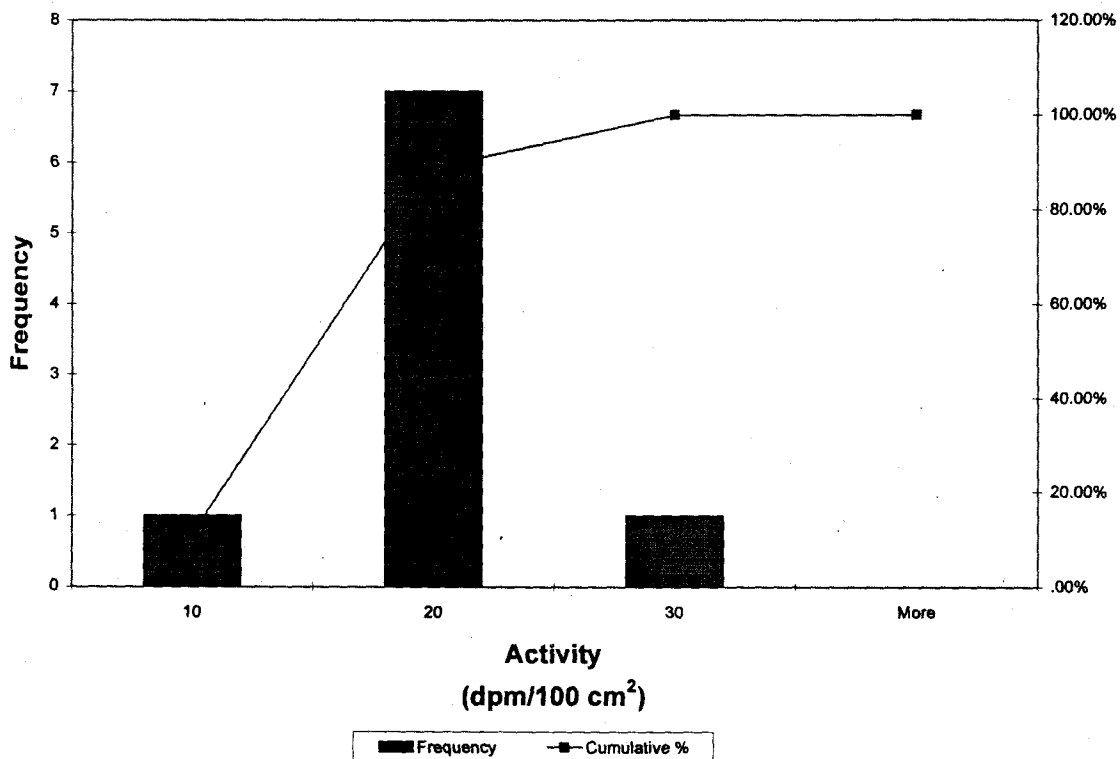


Figure 5-4 (continued). Histogram—Instrument Background Measurements, 727-02

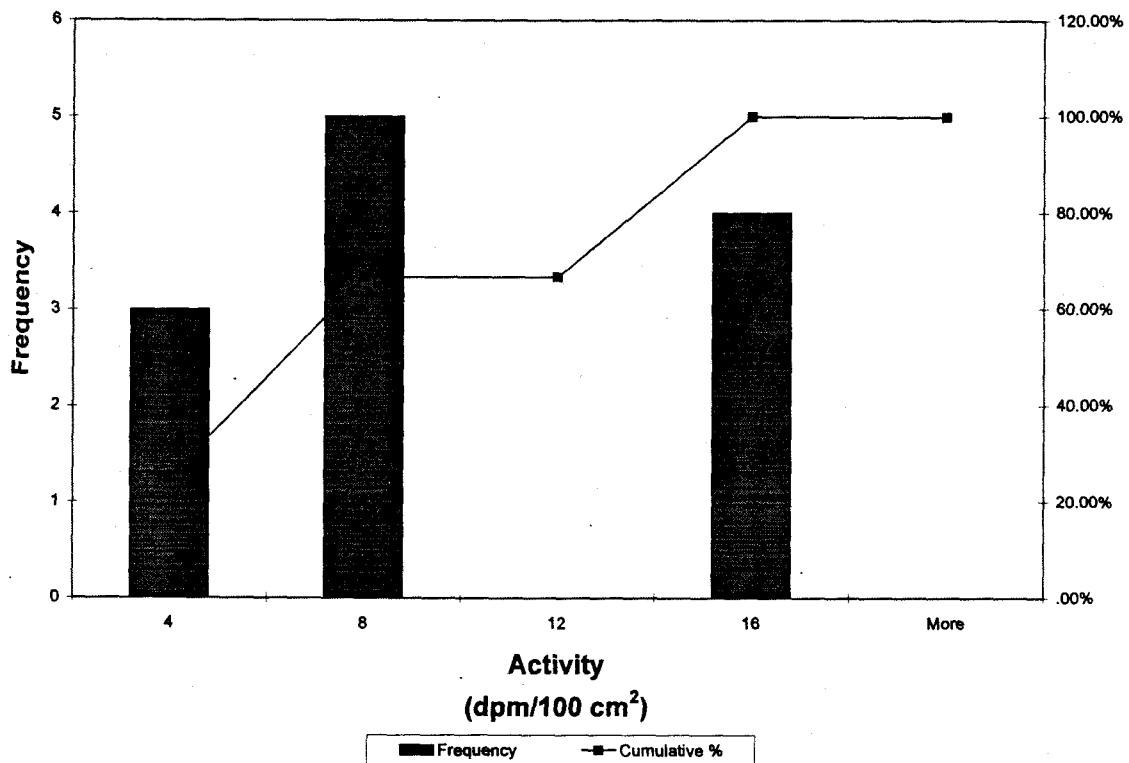


Figure 5-4 (continued). Histogram—Instrument Background Measurements, 782-01

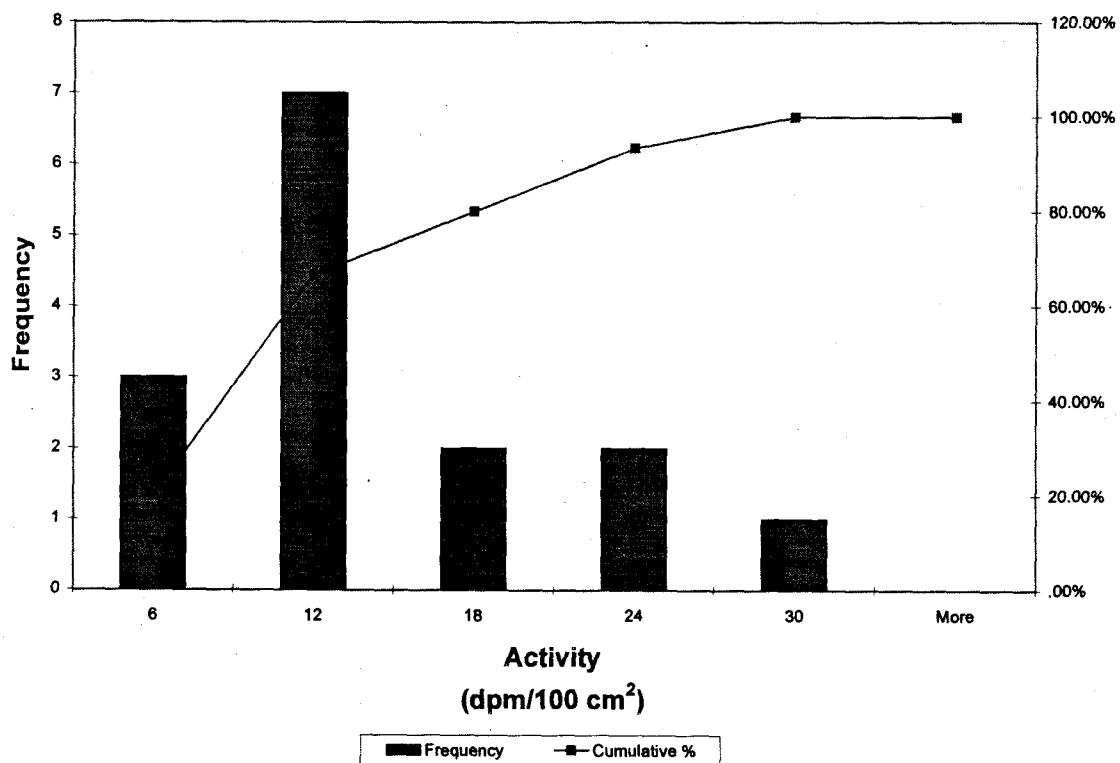


Figure 5-4 (continued). Histogram—Instrument Background Measurements, 782-02

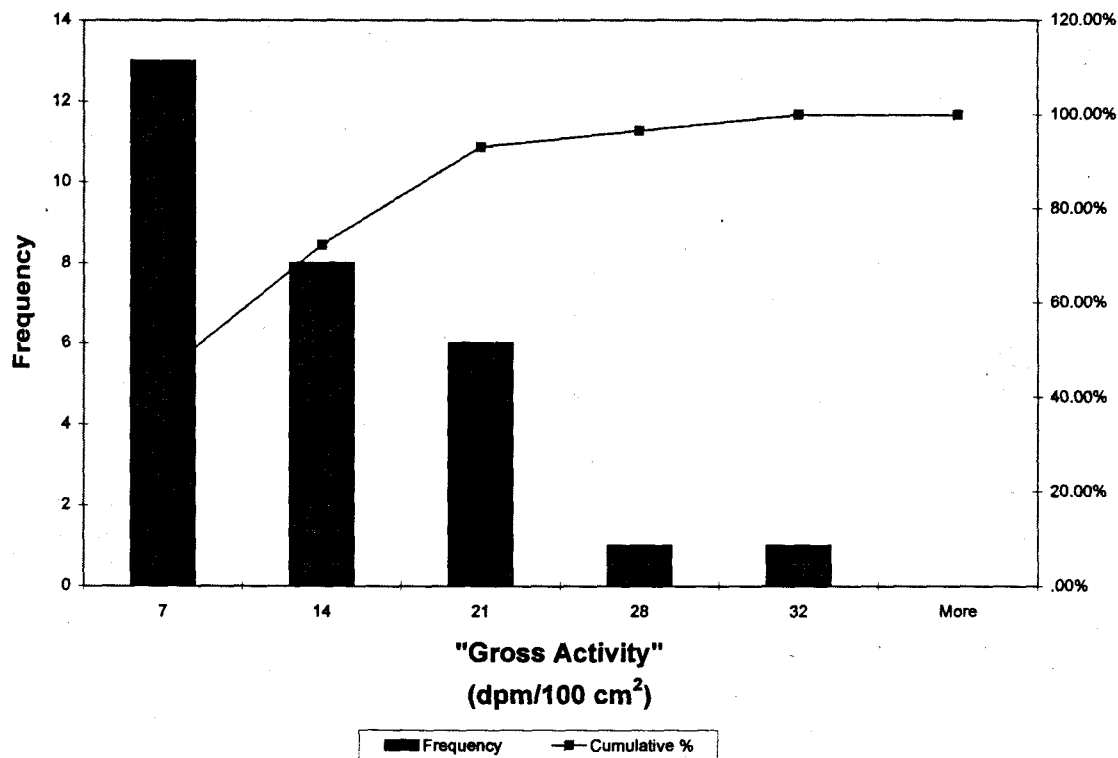


Figure 5-5. Histogram—Direct Static Surface Contamination Measurements, 727-01

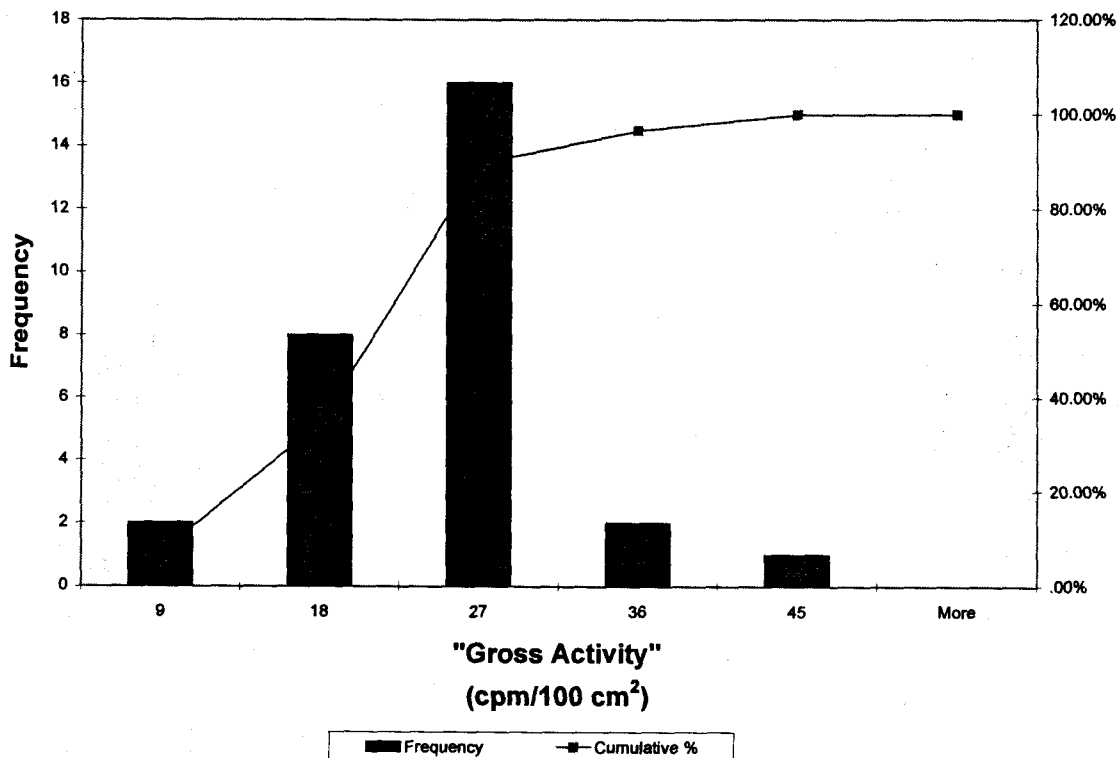


Figure 5-5 (continued). Histogram—Direct Static Surface Contamination Measurements, 727-02

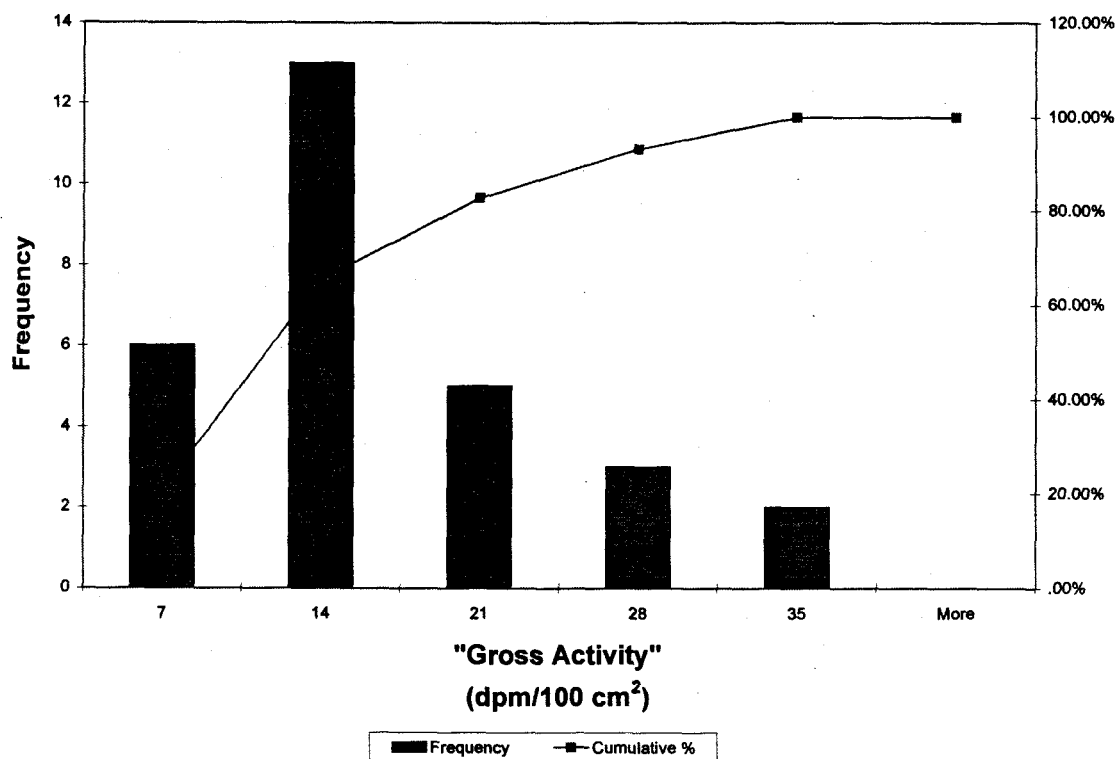


Figure 5-5 (continued). Histogram—Direct Static Surface Contamination Measurements, 782-01

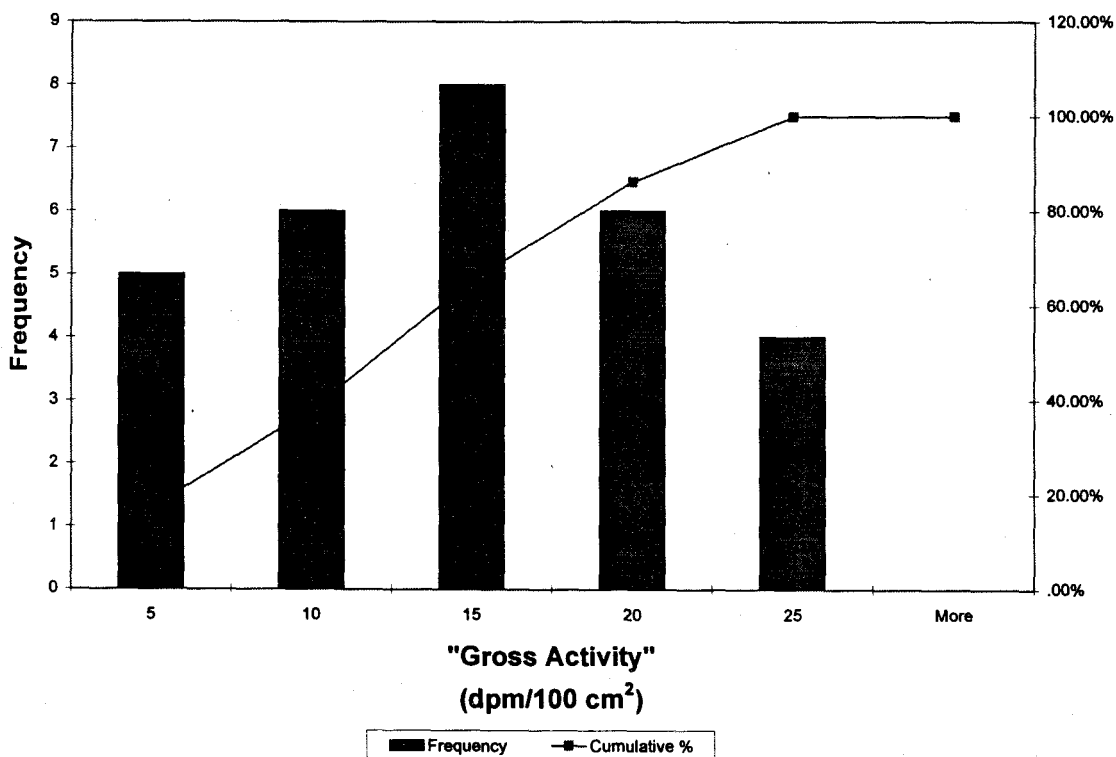


Figure 5-5 (continued). Histogram—Direct Static Surface Contamination Measurements, 782-02

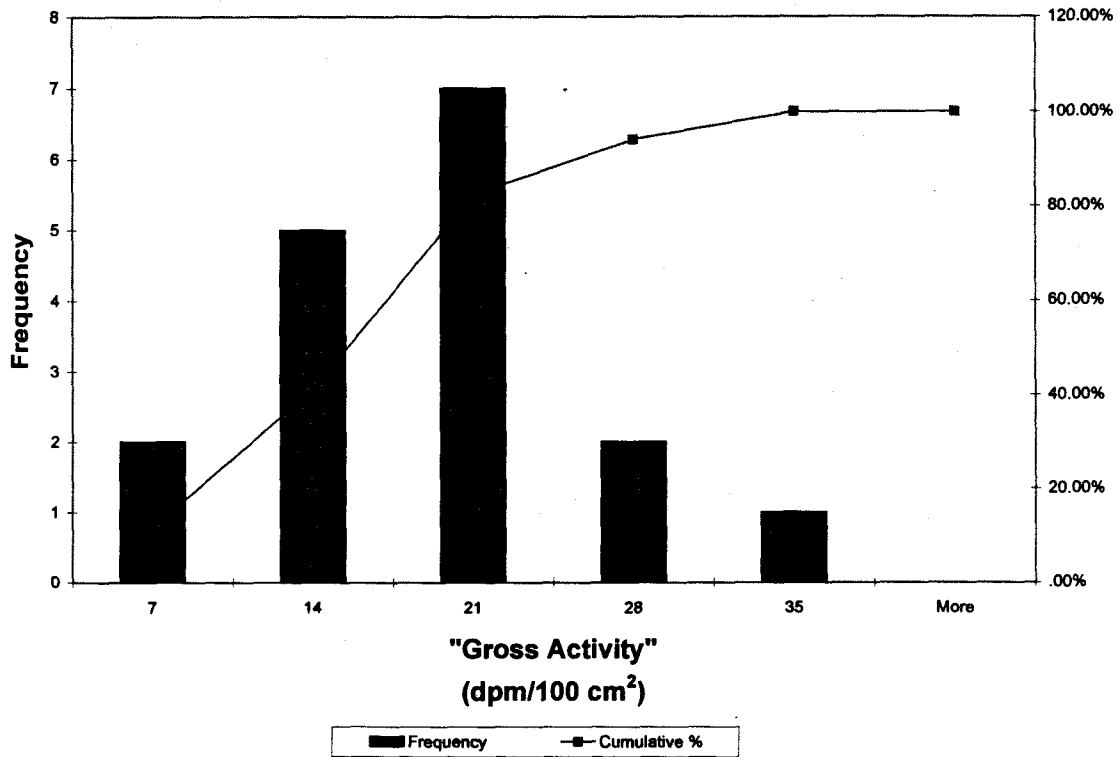


Figure 5-6. Histogram—Post Surface Media Sampling Direct Static Surface Measurements, 727-01

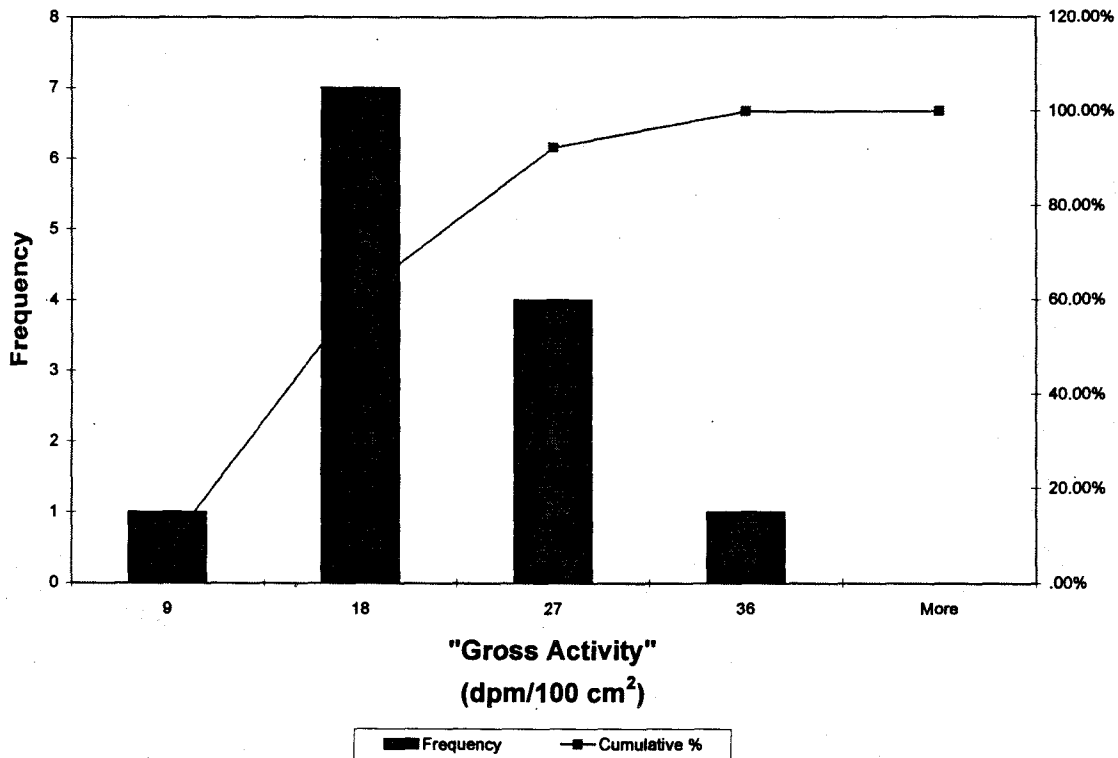


Figure 5-6 (continued). Histogram—Post Surface Media Sampling Direct Static Surface Measurements, 727-02

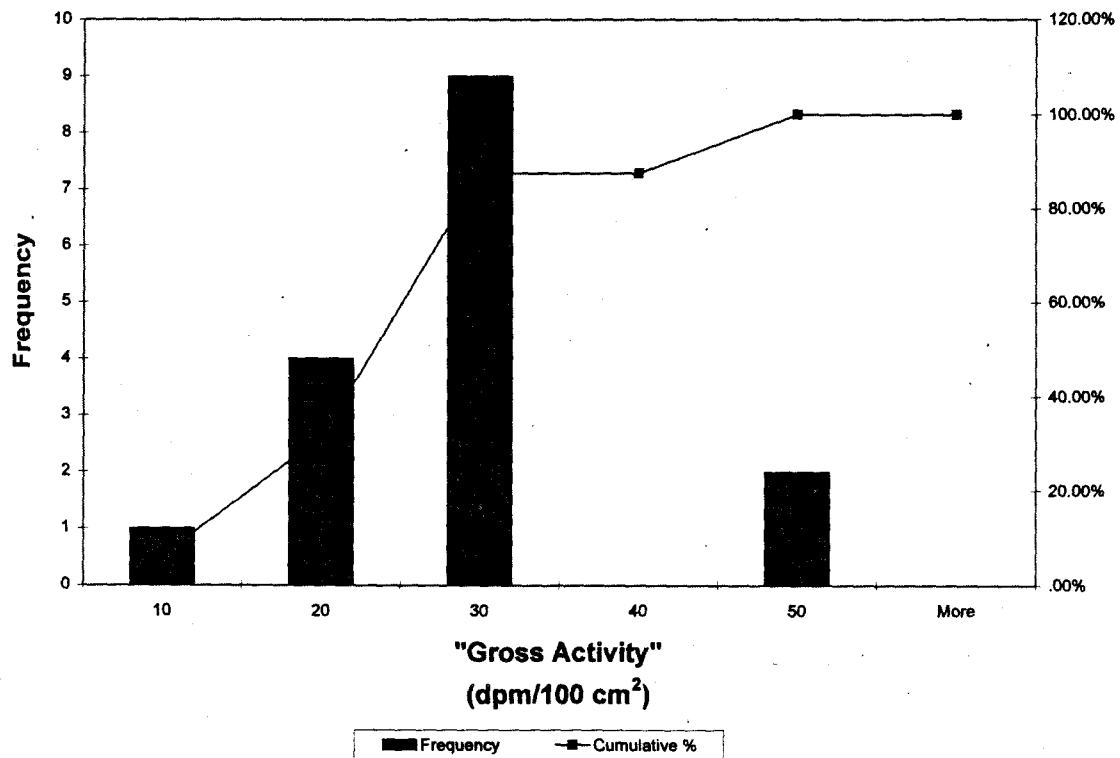


Figure 5-6 (continued). Histogram—Post Surface Media Sampling Direct Static Surface Measurements, 782-01

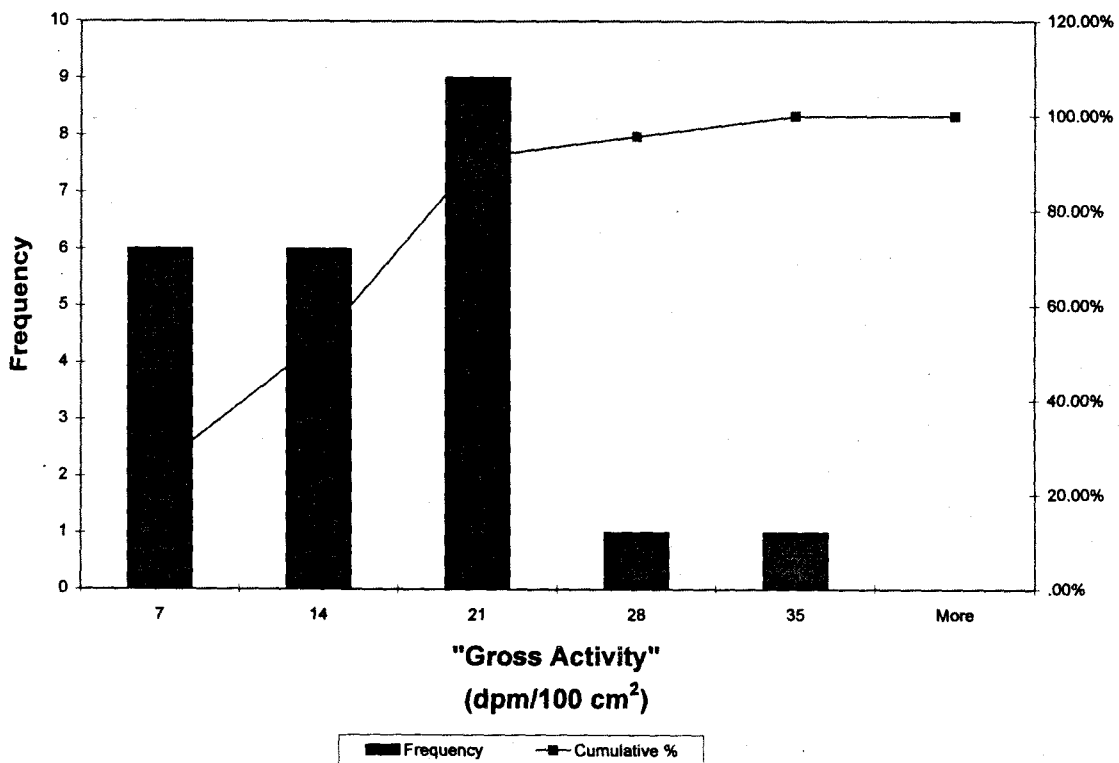


Figure 5-6 (continued). Histogram—Post Surface Media Sampling Direct Static Surface Measurements, 782-02

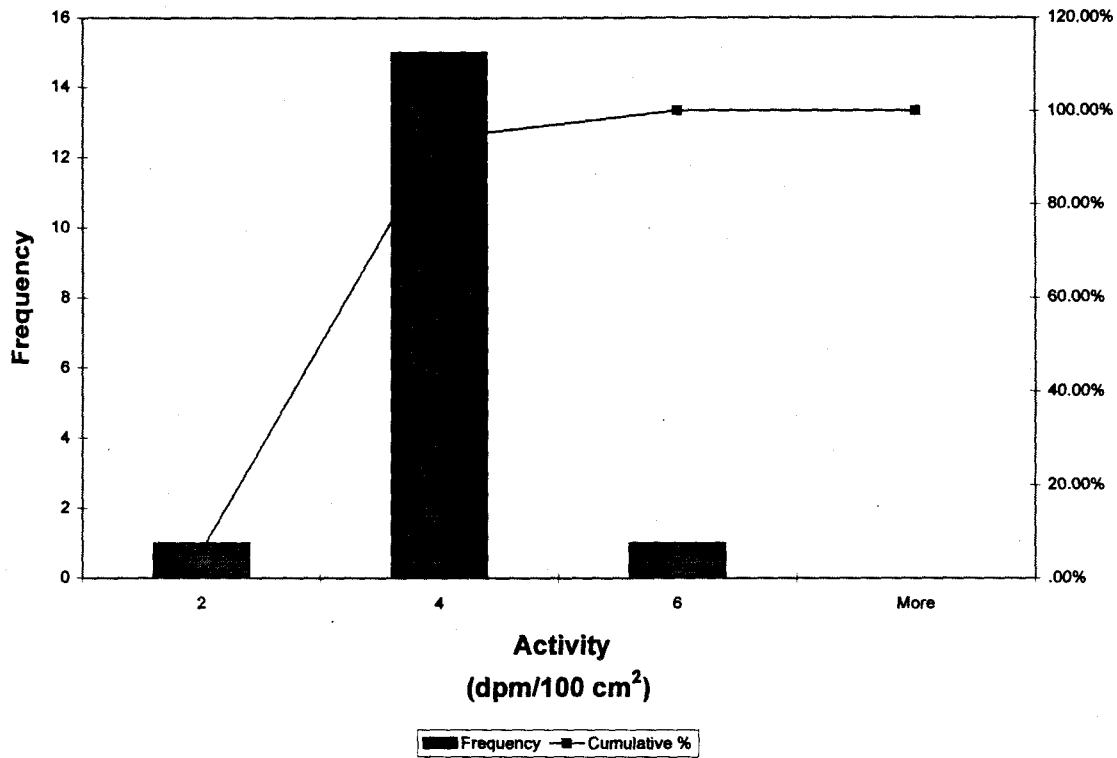


Figure 5-7. Histogram—Surface Media Samples, Transuranic Activity, 727-01

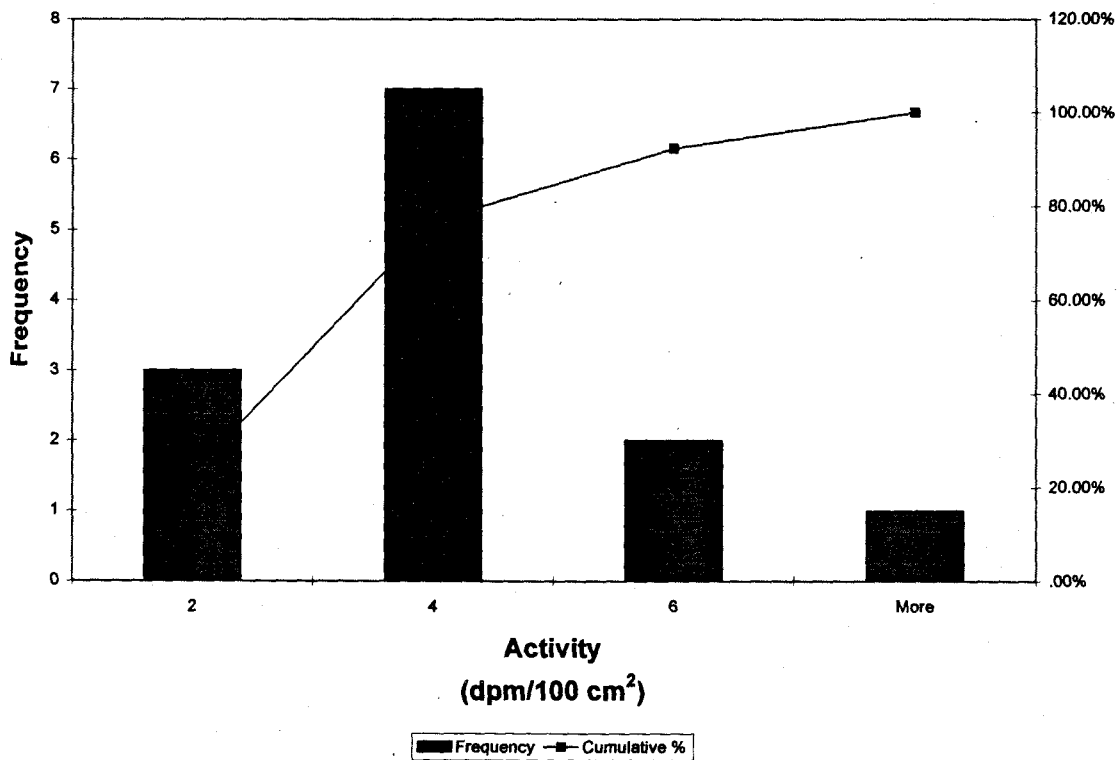


Figure 5-7 (continued). Histogram—Surface Media Samples, Transuranic Activity, 727-02

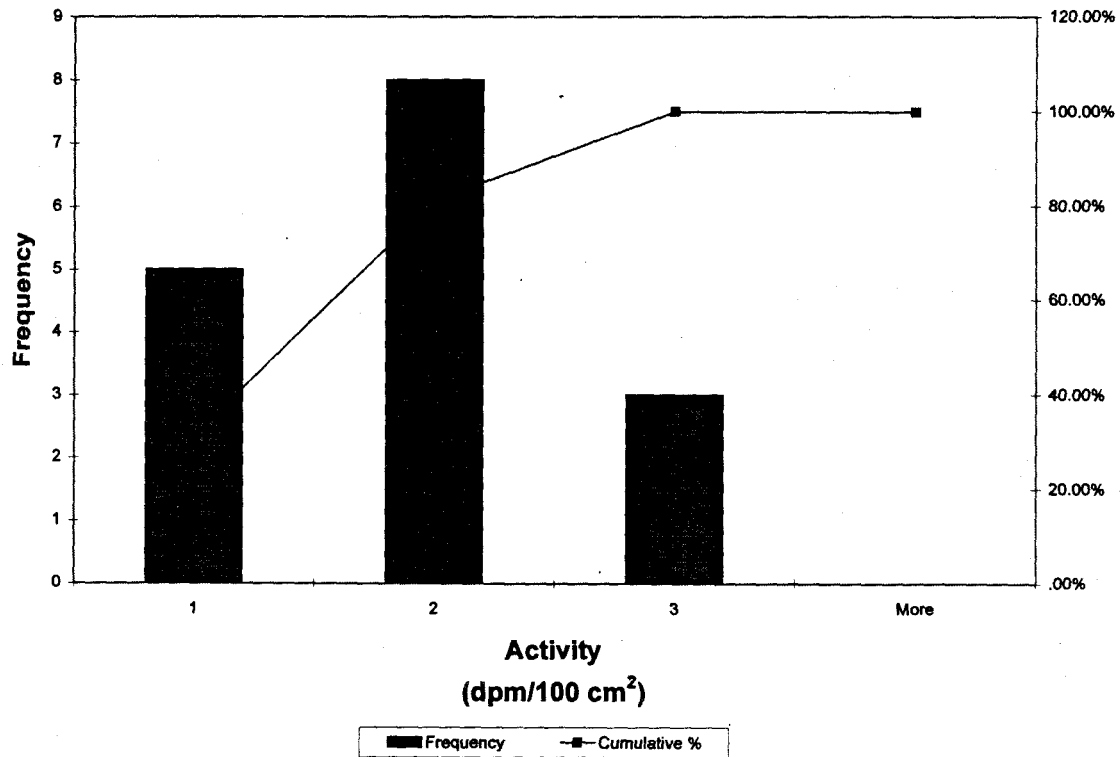


Figure 5-7 (continued). Histogram—Surface Media Samples, Transuranic Activity, 782-01

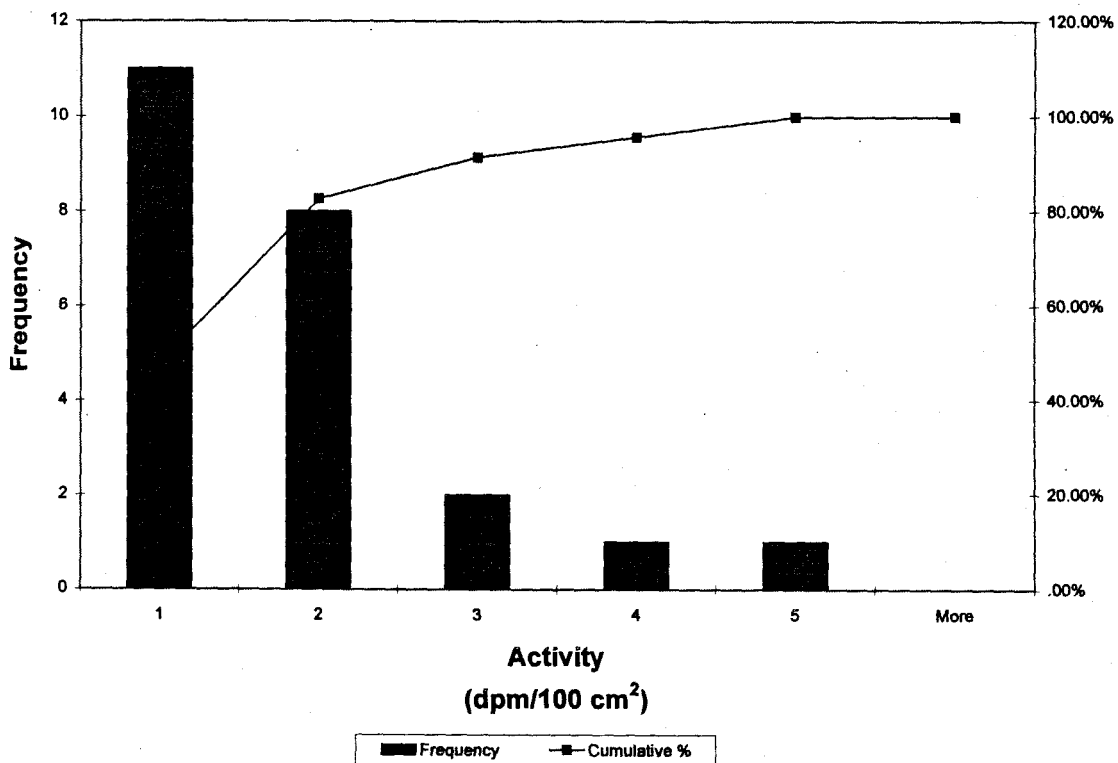


Figure 5-7 (continued). Histogram—Surface Media Samples, Transuranic Activity, 782-02

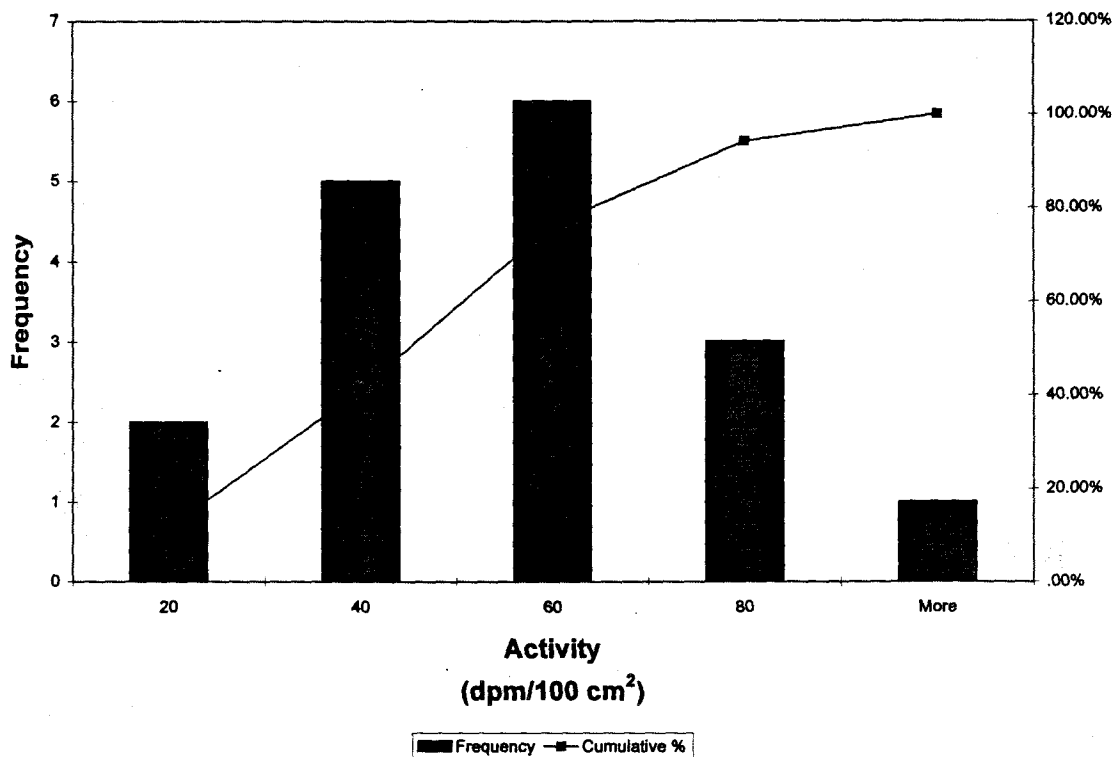


Figure 5-8. Histogram—Surface Media Samples, Uranium Series Activity, 727-01

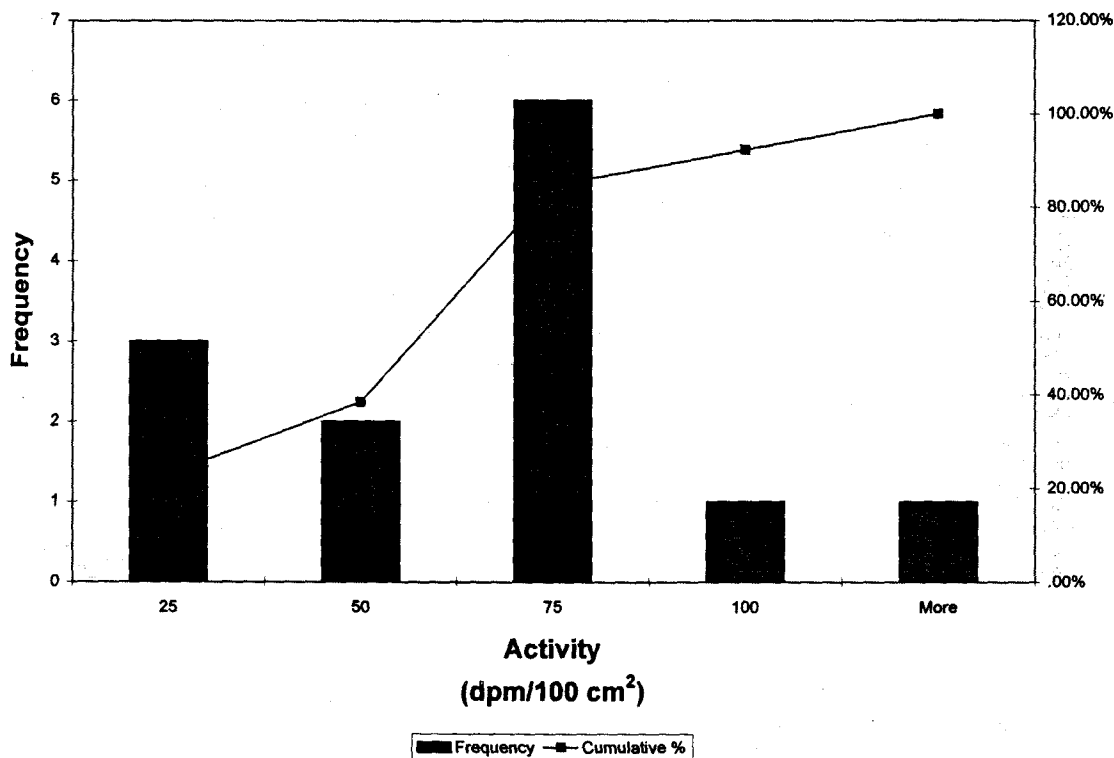


Figure 5-8 (continued). Histogram—Surface Media Samples, Uranium Series Activity, 727-02

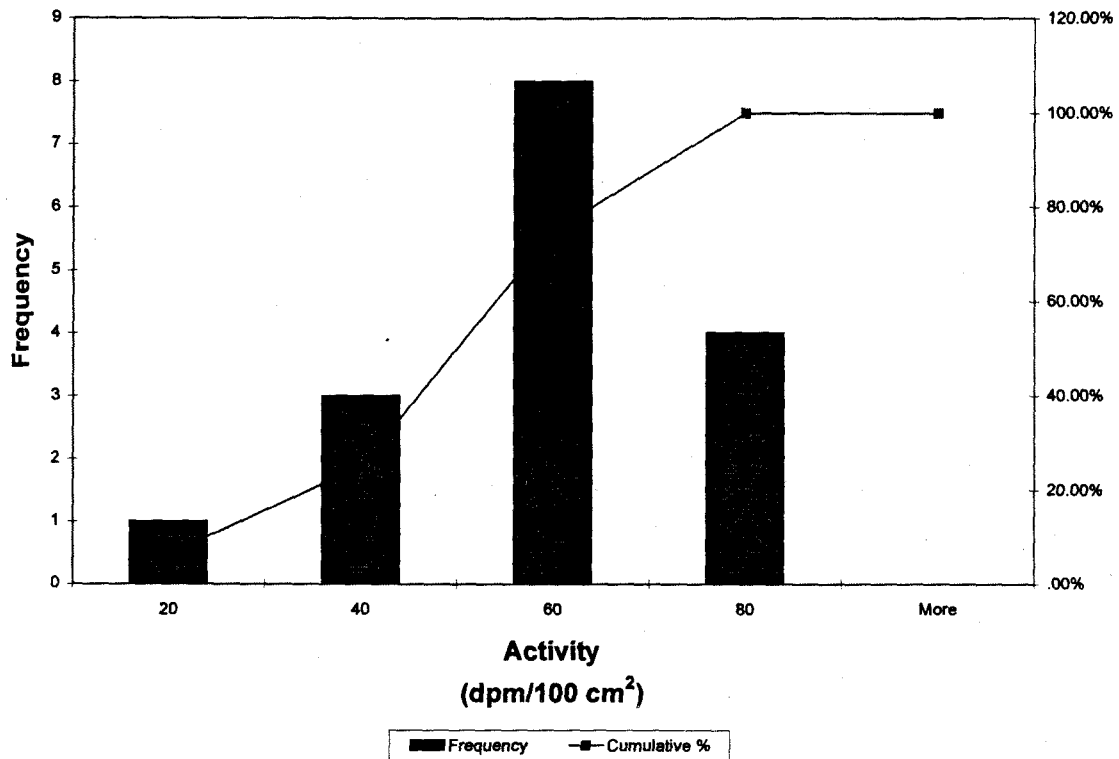


Figure 5-8 (continued). Histogram—Surface Media Samples, Uranium Series Activity, 782-01

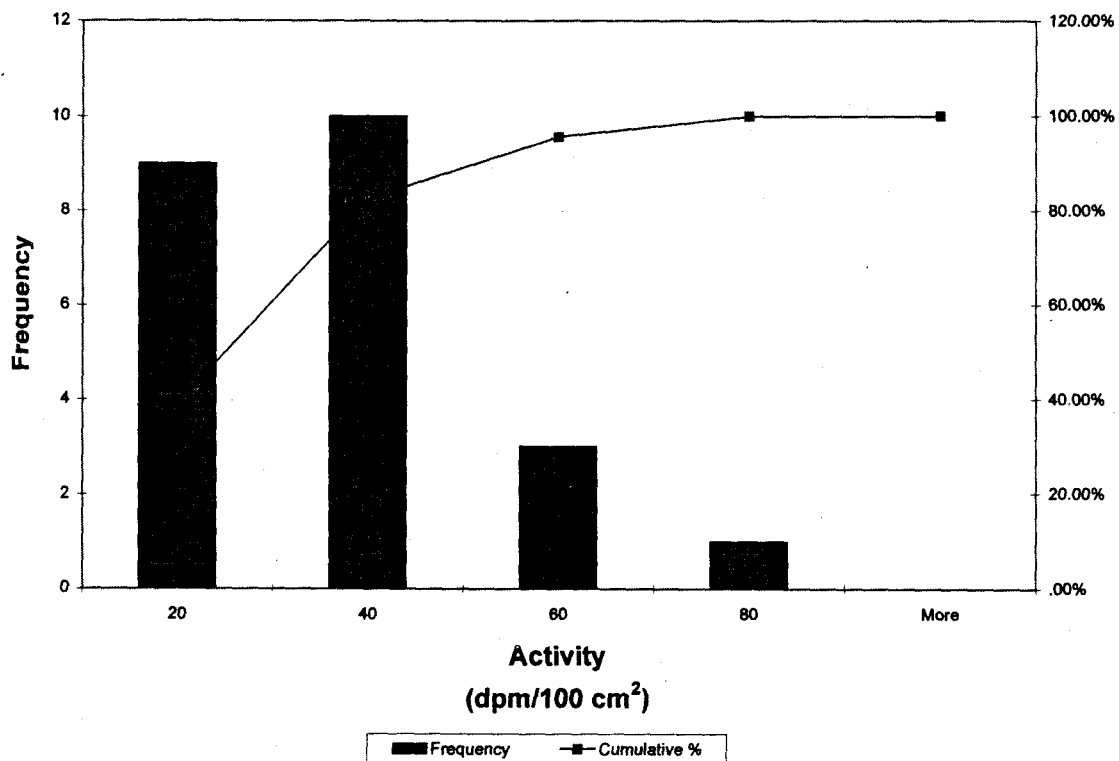


Figure 5-8 (continued). Histogram—Surface Media Samples, Uranium Series Activity, 782-02

Each of the histogram plots provides evidence of left shifted skewness in the data set with most data clustered around a non-discrete central concentration which is substantially below the applicable DCGL. This distribution and skewness is typical of environmental radioactivity data and supports the conclusion that the data distributions are best estimated by the log-normal distribution for the most part.

5.3 High-Low Graphs—Data Variability Graphics

A key element in the evaluation of the sampling and survey data is the variation within the data set. As the data variability increases, the ability of the risk manager to confidently make decisions about the true state of radiological contamination in the survey unit or building in relation to the applicable DCGL and null hypothesis decreases. When variability is small (or excessively large) relative to the difference between the mean and the DCGL, the risk managers can be confident in the decisions made using the data set provided. When evaluating data variability, it is important to know, first, that the data set contains a sufficiently large sample population (number of measurements). Retrospective power curves, demonstrating the “power” of the sign test to reject the null hypothesis with the actual sample size collected, are presented in Section 8.0. High-Low graphs are simple presentations showing the range between the upper and lower 95 percent confidence intervals about the geometric mean. Figures 5-9, 5-10, and 5-11 depict the variability observed in each type of data analyzed.

The pattern of a comparatively low central tendency, and small measure of data variability in each of the data sets presented provide substantial evidence that the estimates of the true mean residual radioactive concentrations presented are below the DCGLs. No DCGL is included in the 95 percent confidence intervals about the mean. The lack of significant variability in any of the data sets is also indicative of a lack of discretely distributed activity (supporting the conclusions of the posting plots above) and excellent precision in the analytical methods employed in the sampling and measurements processes. By presenting the three data sets made with the same instruments and procedures (background, direct static measurements, and post-surface media sampling direct static measurements), it is also evident that they report essentially equivalent measures of activity. In other words, the best estimates of surface activity as measured by direct surface emission are statistically indistinguishable from background.

Other visual presentations of the data are possible and may have been indicated if the data sets available were less robust than they actually are. However, the graphic treatment of the data presented here and in other sections is sufficient to enable the risk managers and decision maker to make confident determinations respecting the data.

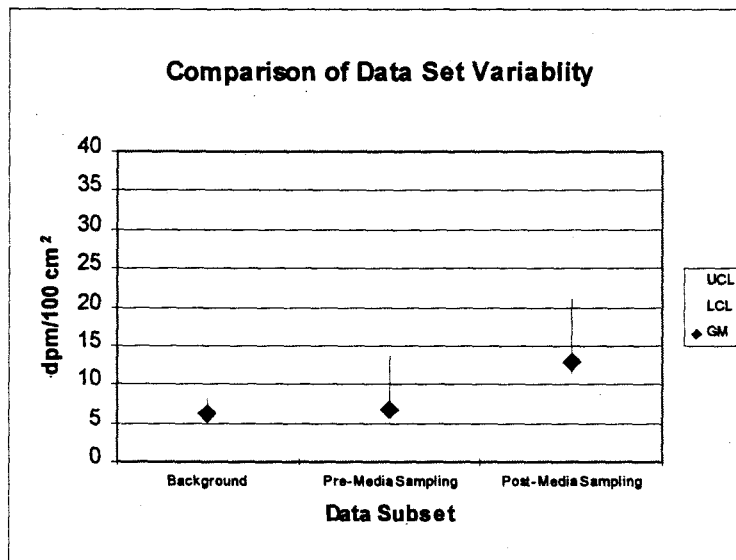


Figure 5-9. High-Low Graphs—Direct Static Surface Measurements, 727-01

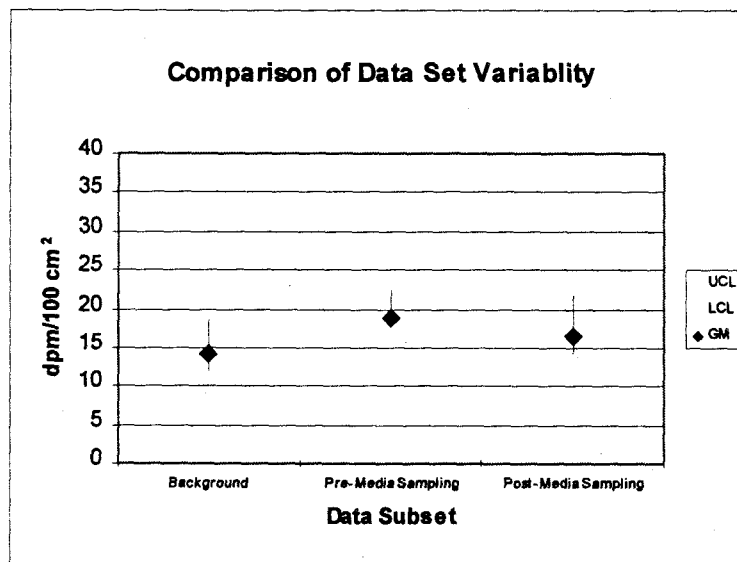


Figure 5-9 (continued). High-Low Graphs—Direct Static Surface Measurements, 727-02

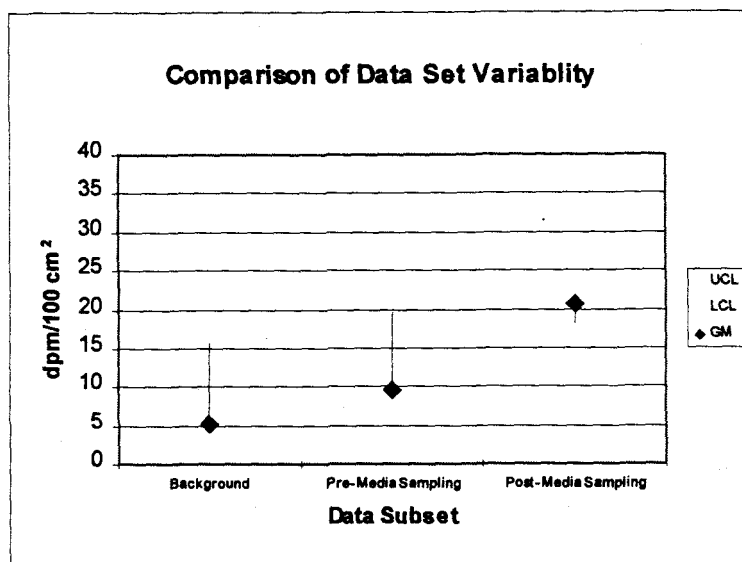


Figure 5-9 (continued). High-Low Graphs—Direct Static Surface Measurements, 782-01

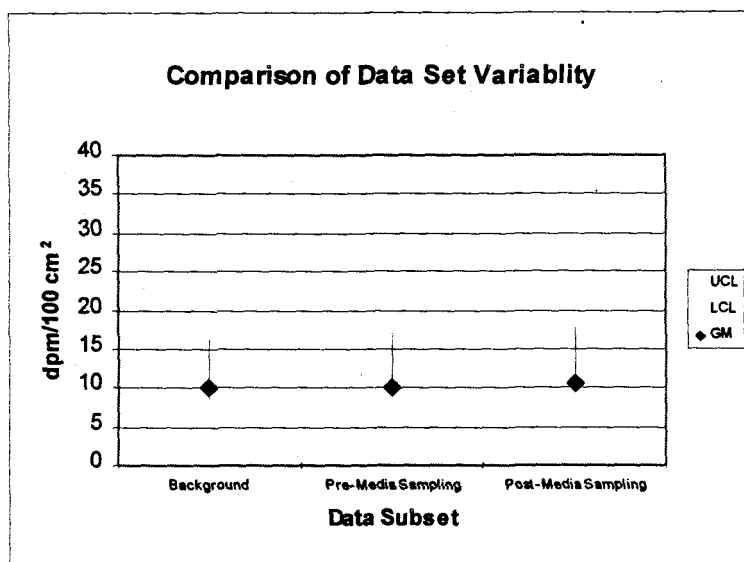


Figure 5-9 (continued). High-Low Graphs—Direct Static Surface Measurements, 782-02

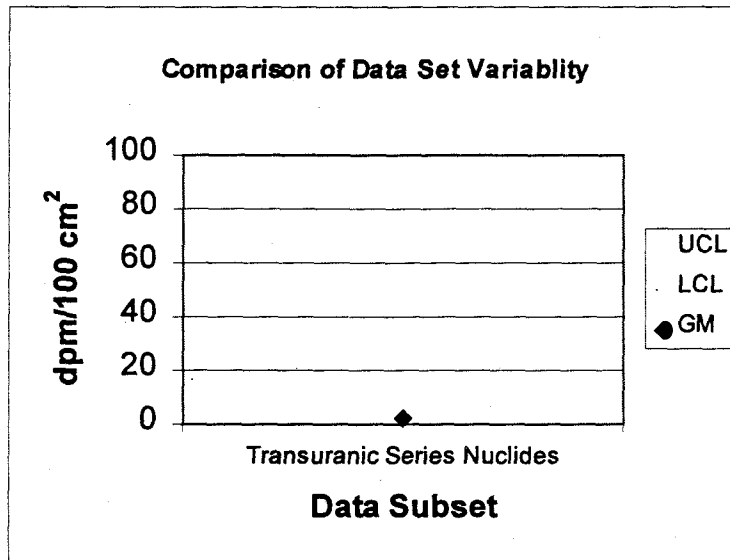


Figure 5-10. High-Low Graphs—Surface Media Samples, Transuranic Activity, 727-01

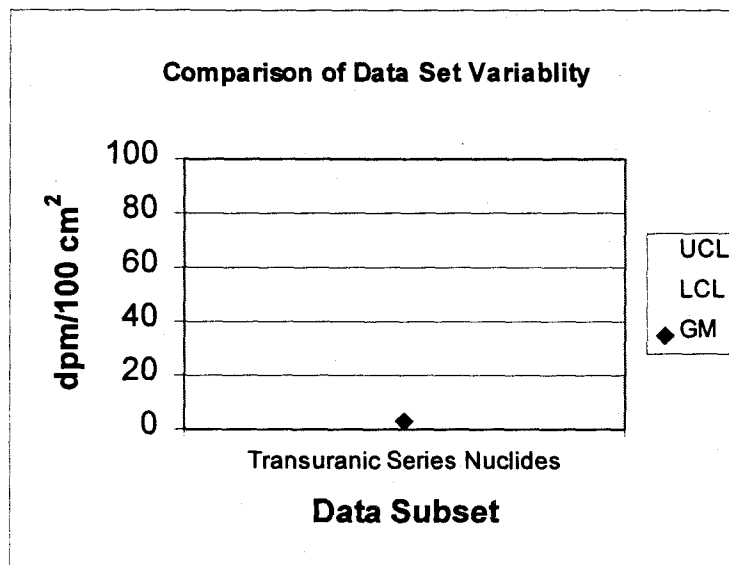


Figure 5-10 (continued). High-Low Graphs—Surface Media Samples, Transuranic Activity, 727-02

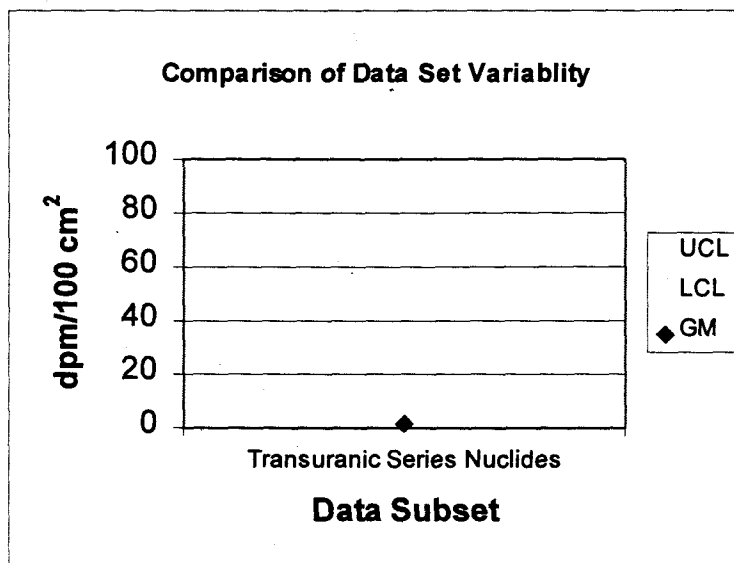


Figure 5-10 (continued). High-Low Graphs—Surface Media Samples, Transuranic Activity, 782-01

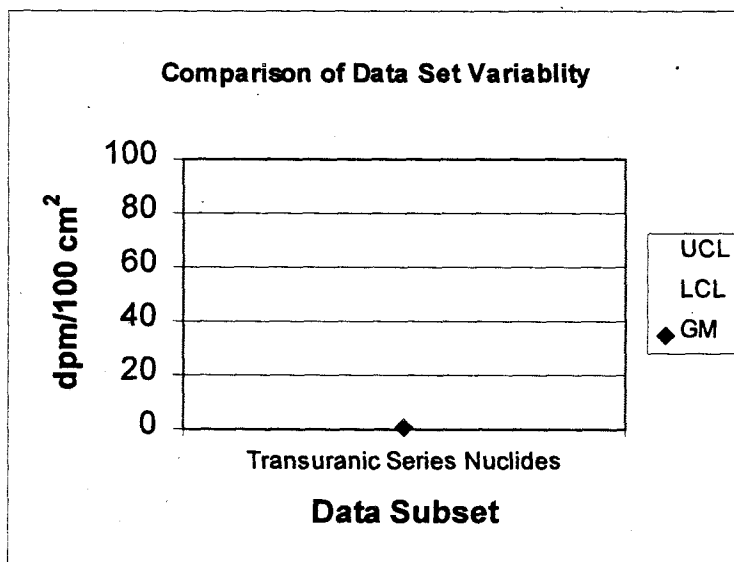


Figure 5-10 (continued). High-Low Graphs—Surface Media Samples, Transuranic Activity, 782-02

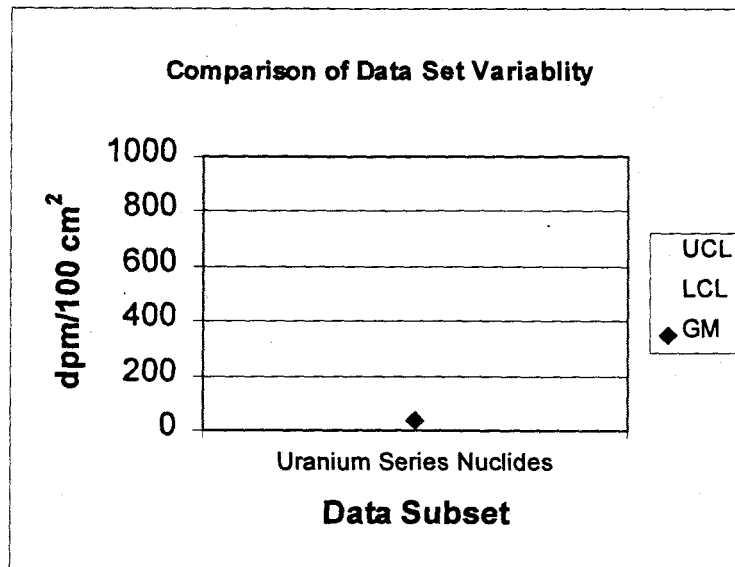


Figure 5-11. High-Low Graphs—Surface Media Samples, Uranium Series Activity, 727-01

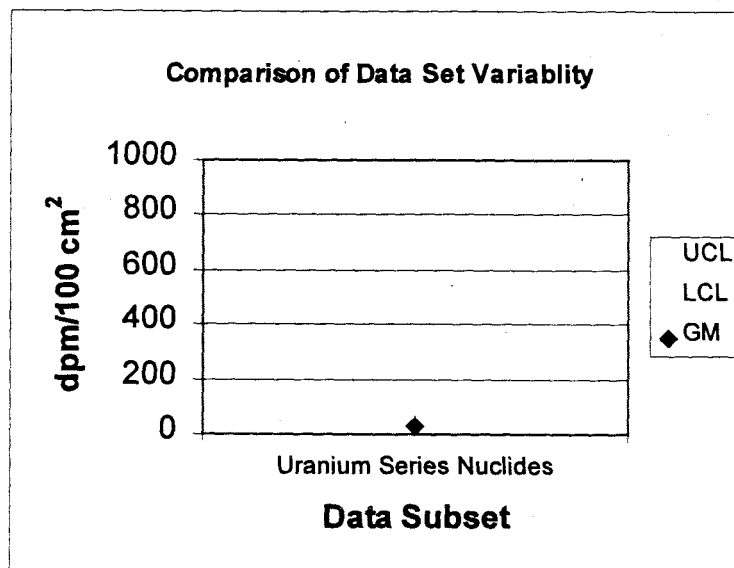


Figure 5-11(continued). High-Low Graphs—Surface Media Samples, Uranium Series Activity, 727-02

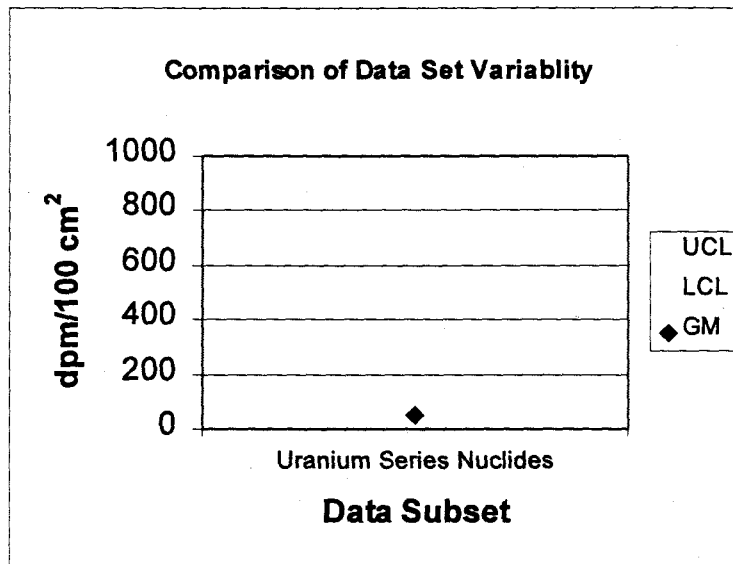


Figure 5-11(continued). High-Low Graphs—Surface Media Samples, Uranium Series Activity, 782-01

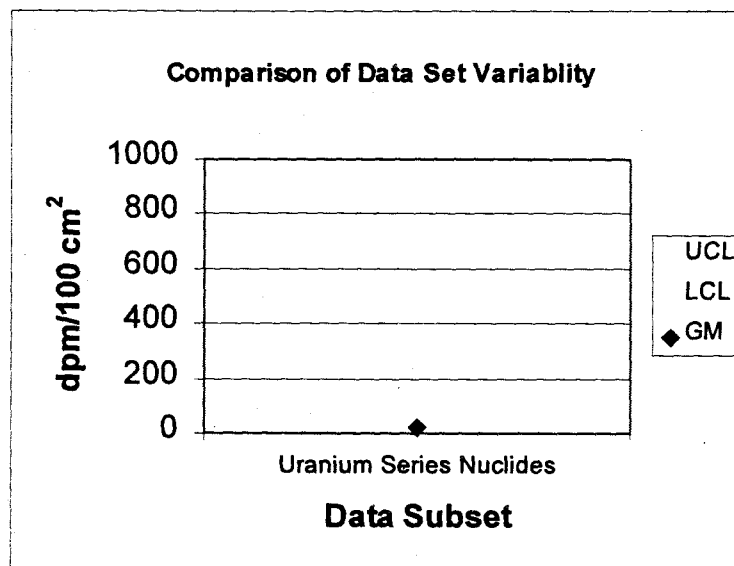


Figure 5-11(continued). High-Low Graphs—Surface Media Samples, Uranium Series Activity, 782-02

6.0 Quality Control Sampling Results and Analysis

An important aspect of any sampling plan is the effort made to assure the quality of data collected. The independent verification process as a whole is a quality assurance method in itself. Thus, it was critical to assure the quality of all of the independent verification data through quality checks and controls, calibrations, training, and qualification of laboratories and services used. The objective of independent verification for the Building 779 Cluster final status radiological surveys, added an element of quality assurance to the design of the sampling evolution. In addition to designing quality checks and controls into the independent verification sampling, the IVC provided for quality control checks to assess the quality of the Contractor's data.

The IV SAP distinguished these two principle quality control objectives in the design of the sampling plan. Stage I quality control sampling was designed to assess the quality of the data collected by the Contractor. Stage II quality control sampling was designed to assess the quality of the data collected by the IVC. In each case where QC samples were used, either for Stage I or Stage II sampling, the samples were maintained under chain-of-custody control from the time they were prepared until they were introduced to either the Contractor's or IVC's sample batch. Tamper seals and locked storage were employed when samples were not in the physical custody of the IVC's Field Team Leader.

The IV SAP specifies quality control sampling to be performed over the duration of the Final Status Survey performance for all survey units in the Building 779 Cluster rather than for each specific building. This report, specific to Buildings 727, 782, and 783, does not contain every element of QC data planned for the cluster of buildings as a whole. The costs associated with implementing separate QC sampling for each building in the 779 Cluster was determined to be prohibitive and unnecessary. Instead, a cumulative assessment and presentation of quality control data is presented with each successive Independent Verification Report of the Contractor's Final Status Survey.

This section of the report presents the quality control data collected and measures employed to assure that quality objectives in the design of the sampling plan were achieved. Section 7.0 assesses the overall data quality against the published or industry accepted data quality indicators.

6.1 Stage I—Independent Quality Control of the Contractor's Sampling

6.1.1 Smear Samples

The IVC provided smear samples to the Contractor for measurement and analysis by the Contractor's selected instrumentation and methods. An unopened package of smear sample media was obtained from the Contractor prior to the start of the independent verification of Buildings 727, 782, and 783. The IVC assigned a series of these as "blanks" and spiked a second series of smears with three different concentrations of an alpha emitting transuranic nuclide (one which is part of the nuclide mix identified as a contaminant of concern for the 779 Cluster).

The spikes were not certified as containing traceable concentrations of the nuclide added. Thus, the spikes do not provide a measure of accuracy directly. Accuracy is established for the instrument measuring the activity on the smears by the RFETS (or contract laboratory, if used)

calibration and analysis procedures. Instead, the spikes serve to provide a comparison between the results achieved by the Contractor and those achieved by the IVC.

The blank smears test the ability of the counting instrument used to distinguish between background and added activity as well as the ability of the counting technician and sample handling process to prevent cross-contamination.

The IVC introduced 20 blank smears and 21 spiked smears into the Contractor's smear sampling batch during the final status survey of the Building 779 Cluster. The QC samples were packaged and identified exactly as the Contractor's procedure dictated. Because the Contractor used the same technician to collect and analyze the smear samples they collected, it was not possible to present a double blind set of QC samples. He would know when samples other than those he personally collected were introduced. They were presented as a single blind set of QC samples. The Contractor's counting technician was not aware of the objective of the samples, nor the fact that some were blanks and some were spikes.

The blank smears were prepared by wiping a clean, unaffected, and uncontaminated surface. Each was then packaged individually, assigned a unique QC sample number, and physically controlled to ensure custody and integrity. The spiked smears were prepared by pipetting liquid standard concentrations onto a smear filter disc.

Spiked smears were prepared with three different quantities of radioactivity to provide a range of gross alpha radioactivity concentrations over the range expected to be encountered in the Final Status Survey. This range is necessarily small and near zero for a Final Status Survey.

The QC samples provided to the Contractor were measured and reported to the IVC. Table 6-1 provides a crosswalk between the IVC and Contractor assigned sample numbers and presents a summary of the results obtained by the Contractor and the GJO Analytical Laboratory which establishes a cumulative cross comparison as a measure of the relative accuracy of the instruments and methods employed.

From Table 6-1, it is seen that all but one of the 20 blank smears returned results indicating no detectable radioactivity or activity less than the reported MDA. As reported in the IVC Sampling and Survey Report, Building 729 (DOE 1999b), sample #2C was identified by the Contractor as having 4.5 dpm/100 cm².

Each of the 21 spiked smear samples yielded measurable radioactivity. The 21 spiked activities were differentiated from one another in the Contractor's assay. Yet, samples #6C, #13C, and #16C were reported to have activity below the MDA for the method. As reported in the IVC Sampling and Survey Report, Building 729 (DOE 1999b), this might be caused by too short of a counting time (background, sample, or both) to adequately distinguish between background and low-level activity. Smears #6C and #13C were spiked to the lowest concentration of the three and were expected to return the lowest measurement of activity among the three. Likewise, the highest spiked activity returned the highest measurement of activity among the three. Another possible explanation for the lower than expected result on these smear samples is in the method used to prepare the spiked samples. As mentioned earlier, a liquid standard containing an alpha emitting transuranic nuclide was pipetted onto the smear and then allowed to dry. It is likely that a significant fraction of the total activity deposited migrated to a depth in the smear matrix that the activity was attenuated by the sample media itself.

Table 6-1. Results of the Contractor's Assay of QC Smear Samples Provided by the IVC

IVC Sample ID#	Contractor Assigned Sample ID#	Sample Type	Contractor Reported MDA (dpm)	IVC Reported MDA (dpm)	Contractor Reported Results (dpm)	IVC Reported Results (dpm)
NED428	1C	Blank	4.1	^a	0.0	^a
NED429	2C	Blank	4.1	^a	4.5	^a
NED430	3C	Blank	4.1	^a	0.0	^a
NDL431	4C	Blank	10.3	^a	0.3	^a
NED432	5C	Blank	8.5	^a	-0.6	^a
NDL289	6C	Spike	4.1	^a	1.5	^a
NDL290	7C	Spike	8.5	5.3	9.9	24.1
NDL291	8C	Spike	4.1	^a	28.5	^a
NDL292	9C	Spike	8.5	5.4	30.9	54.8
NDL293	10C	Spike	4.1	^a	30.9	^a
NDL294	12C	Spike	10.3	5.5	52.9	96.5
259740	42C	Blank	8.5	4.9	-0.6	1.1
259741	43C	Blank	8.5	4.9	-0.6	0.3
259742	44C	Blank	8.5	4.9	-0.6	0.3
259743	45C	Blank	7.5	4.8	0.9	1.1
259744	46C	Blank	7.5	4.9	0.9	0.3
259745	47C	Blank	7.5	4.9	-0.6	0.3
259746	48C	Blank	7.5	4.9	0.9	0.3
259747	49C	Blank	7.5	4.9	0.9	-0.4
259748	50C	Blank	8.8	4.9	0.0	0.3
259749	66C	Blank	8.8	4.9	0.0	0.3
259750	67C	Blank	8.8	4.9	0.0	0.3
259751	68C	Blank	8.8	4.9	0.0	0.3
259752	69C	Blank	8.8	5.0	1.5	-0.5
259753	70C	Blank	8.8	4.9	1.5	0.3
259754	81C	Blank	8.8	4.9	1.5	1.9
259770	13C	Spike	8.5	4.9	6.9	7.3
259771	14C	Spike	8.5	5.0	12.9	12.0
259772	15C	Spike	7.5	4.9	8.4	12.8
259773	16C	Spike	7.5	5.0	3.9	20.6
259774	17C	Spike	7.5	5.0	12.9	12.8
259775	18C	Spike	8.5	5.0	23.4	31.5
259776	19C	Spike	10.3	5.1	27.3	38.4
259777	20C	Spike	8.8	5.0	19.7	36.9
259778	21C	Spike	8.8	5.0	34.8	32.2
259779	22C	Spike	8.8	5.0	30.3	26.8
259780	28C	Spike	10.3	5.2	73.9	96.8
259781	29C	Spike	10.3	5.2	84.4	96.1
259782	30C	Spike	8.8	5.4	87.9	87.4
259783	26C	Spike	8.8	5.3	75.8	94.5
259784	27C	Spike	8.8	5.3	77.3	76.5

^a Smear samples were disposed of by the Contractor before being counted by the GJO Analytical Laboratory. The Contractor counted the smears with an Eberline model SAC-4 alpha smear counters (serial #1069, 1406, and 814). The measured background was 0.2, 0.4, and 0.3 cpm respectively. The efficiency was established at 33.3 percent.

6.1.2 Surface Media Samples

A total of 23 Stage I and 23 Stage II surface media QC samples have been analyzed for a cumulative comparison. Surface Media QC samples were made in duplicate (one to be introduced in the Contractor's sample batch and the other in the IVC's sample batch). Before being introduced by either the Contractor or IVC, they are analyzed by the GJO Analytical Laboratory. A comparison of results between the initial count by the GJO Analytical Laboratory, the Contractor's Laboratory, and the GJO Analytical Laboratory when the QC sample was recounted when introduced with the IVC sample batch is presented in Table 6-2.

Identification numbers assigned to samples provided to the Contractor on October 9, 1999 (samples 259868 – 259872) were incorrectly transferred as Contractor ID #s 99R0317-021, 99R0317-022, 99R0317-018, 99R0317-019, and 99R0317-020, respectively. Samples 259868 – 259872 should have been transferred as 99R0317-018, 99R0317-019, 99R0317-020, 99R0317-021 and 99R0317-022, respectively. Analytical results are correctly matched to the corresponding sample identification number in Table 6-2 of this report.

Table 6-2. Results of the Contractor's Assay of QC Surface Media Samples Provided by the IVC

Surface Media Sample		Am-241	Pu-238	Pu-239/240	U-234	U-235	U238
		PCI/g					
GJO Lab ID#	259851	0.01	0.02	0.03	0.56	0.07	0.53
IVC ID#	MED0000213	0.01	0.01	0.02	0.55	0.04	0.56
Contractor ID#	99A9022-019	0.12	^a	0.13	0.68	0.14	0.39
GJO Lab ID#	259852	0.03	0.03	0.02	0.81	0.05	0.77
IVC ID#	MED0000162	0.03	0.02	0.02	0.88	0.06	0.75
Contractor ID#	99A8940-019	0.04	^a	0.05	0.59	0.03	0.80
GJO Lab ID#	259853	0.24	0.01	0.51	2.07	0.09	2.04
IVC ID#	MED0000163	0.29	0.02	0.49	2.26	0.13	2.12
Contractor ID#	99A8940-020	0.28	^a	0.69	1.78	0.19	2.14
GJO Lab ID#	259854	0.30	0.01	0.46	0.71	0.04	0.76
IVC ID#	MED0000214	0.30	0.01	0.35	0.62	0.04	0.66
Contractor ID#	99A9009-020	0.09	^a	0.54	0.41	-0.01	0.38
GJO Lab ID#	259855	0.18	0.04	0.37	0.53	0.04	0.54
IVC ID#	MED0000271	0.20	0.04	0.39	0.36	0.06	0.49
Contractor ID#	99A9009-019	0.28	^a	0.35	0.28	-0.01	0.33
GJO Lab ID#	259856	0.21	0.02	0.34	0.99	0.05	0.86
IVC ID#	MED0000243	0.17	0.01	0.35	0.71	0.06	0.87
Contractor ID#	99A9460-021	0.20	^a	0.36	0.69	0.02	1.08
GJO Lab ID#	259857	0.31	0.01	0.43	0.99	0.08	0.89
IVC ID#	MED0000200	0.18	0.02	0.33	0.88	0.05	0.90
Contractor ID#	99A9460-022	0.16	^a	0.26	0.80	-0.01	0.76

Table 6-2 (continued). Results of the Contractor's Assay of QC Surface Media Samples Provided by the IVC

Surface Media Sample		Am-241	Pu-238	Pu-239/240	U-234	U-235	U238
		PCI/g					
GJO Lab ID#	259858	0.83	0.02	1.40	1.31	0.08	1.30
IVC ID#	MED0000180	0.78	0.02	1.43	1.56	0.06	1.34
Contractor ID#	99A9460-023	0.63	^a	1.16	1.03	0.09	1.04
GJO Lab ID#	259859	0.82	0.02	1.66	1.40	0.05	1.33
IVC ID#	MED0000189	0.91	0.02	1.70	1.34	0.06	1.34
Contractor ID#	99A9460-024	0.83	^a	1.74	1.56	0.06	1.30
GJO Lab ID#	259860	0.55	0.02	1.23	0.83	0.07	0.68
IVC ID#	MED0000215	1.37	0.02	1.11	0.71	0.04	0.72
Contractor ID#	99A9460-025	0.72	^a	0.92	0.57	-0.01	0.44
GJO Lab ID#	259861	1.12	0.01	2.36	1.02	0.06	1.03
IVC ID#	MED0000164	1.21	0.01	1.97	0.95	0.04	0.95
Contractor ID#	99A9460-026	0.80	^a	2.21	0.67	0.05	0.62
GJO Lab ID#	259862	0.49	0.03	0.78	1.42	0.07	1.18
IVC ID#	MED0000216	0.60	0.03	1.05	1.67	0.11	1.62
Contractor ID#	99A9460-027	0.29	^a	0.53	1.17	0.03	1.05
GJO Lab ID#	259863	1.00	0.08	1.50	0.91	0.10	1.04
IVC ID#	MED0000217	1.33	0.02	2.40	0.83	0.08	0.78
Contractor ID#	99A9460-028	1.08	^a	2.31	0.57	0.02	0.58
GJO Lab ID#	259864	1.71	0.04	3.08	0.58	0.10	0.47
IVC ID#	MED0000165	1.65	0.01	2.99	0.58	0.04	0.56
Contractor ID#	99A9460-029	1.66	^a	3.41	0.52	0.03	0.32
GJO Lab ID#	259865	0.20	0.03	0.66	1.40	0.13	1.03
IVC ID#	MED0000244	0.10	0.01	0.24	1.21	0.01	0.85
Contractor ID#	99A9460-030	0.76	^a	1.20	0.88	-0.00	0.84
GJO Lab ID#	259866	1.27	0.04	2.60	0.59	0.09	0.38
IVC ID#	MED0000451	1.21	-0.00	2.44	0.51	0.05	0.48
Contractor ID#	99R0317-016	1.10	^a	1.72	0.68	0.06	0.65
GJO Lab ID#	259867	1.15	0.05	2.46	1.63	0.11	1.64
IVC ID#	MED0000272	0.66	0.02	2.08	1.22	0.06	1.16
Contractor ID#	99R0317-017	0.80	^a	2.61	1.52	0.24	1.27
GJO Lab ID#	259868	1.17	0.02	3.28	0.64	0.08	0.64
IVC ID#	MED0000166	0.69	0.02	1.69	0.53	0.04	0.49
Contractor ID#	99R0317-021	0.75	^a	1.32	0.57	0.16	0.75

*Table 6-2 (continued). Results of the Contractor's Assay of QC Surface Media Samples
Provided by the IVC*

Surface Media Sample		Am-241	Pu-238	Pu-239/240	U-234	U-235	U238
		PCi/g					
GJO Lab ID#	259869	3.39	0.04	5.27	0.56	0.07	0.61
IVC ID#	MED0000452	4.70	-0.01	10.94	0.79	0.05	0.57
Contractor ID#	99R0317-022	3.11	^a	6.01	0.45	0.03	0.67
GJO Lab ID#	259870	4.02	0.04	8.59	1.63	0.11	1.60
IVC ID#	MED0000273	7.08	0.02	11.93	1.64	0.07	1.49
Contractor ID#	99R0317-018	5.03	^a	^a	1.41	0.32	1.77
GJO Lab ID#	259871	8.73	0.05	16.32	2.02	0.09	1.84
IVC ID#	MED0000218	7.30	0.01	12.92	1.93	0.11	1.86
Contractor ID#	99R0317-019	6.90	^a	14.2	2.41	0.16	2.30
GJO Lab ID#	259872	14.48	0.04	28.93	2.44	0.10	2.28
IVC ID#	MED0000245	13.38	0.04	26.22	2.32	0.13	2.06
Contractor ID#	99R0317-020	14.20	^a	22.20	2.50	0.19	2.42
GJO Lab ID#	259873	3.90	0.06	6.62	1.58	0.10	1.65
IVC ID#	MED0000274	3.30	0.01	6.78	1.61	0.45	1.41
Contractor ID#	99A9022-020	5.02	^a	8.28	1.14	0.76	1.83

^aThe Contractor did not analyze for this radionuclide.

6.1.3 Direct Surface Emission Measurements

The Contractor and the IVC chose to utilize the same response check source to test the response of instruments used to make direct surface emission measurements (Table 6-3). This enabled the comparison of routine instrument response checks using the same isotope, geometry, and activity. Three instrument systems were employed to make direct surface emission measurements during the Final Status Survey of Buildings 727, 782, and 783. The Contractor employed a subcontractor, Millennium Services, who used a proprietary system (SCM/SIMS) developed by Shonka Research Associates to perform the scan surveys. The SCM is fundamentally a gas proportional counter and the SIMS is the survey information management software. The Contractor also used a NE Electra with a DP-6 dual phosphor scintillation probe to make direct static surface measurements for comparison with the DCGL_w. The IVC used the Eberline model E-600 multi-purpose survey instrument with a HP-100 gas proportional probe.

Table 6-3. Comparison of Response of Instruments Used to Make Direct Surface Measurements

Parameter	Millennium SCM/SIMS	NE Electra w/ DP-6	EberlineE-600 w/HP-100
Number of Measurements	20	20	20
2 π Source Surface Emission Rate	1604	1604	1604
Mean Activity Observed	1315	1261	1302
Standard Deviation	280	83	53
Coefficient of Variation	0.22	0.07	0.04

6.2 Stage II—Quality Control of the Independent Verification Sampling

Stage II QC sampling is associated specifically with the IVC's field sampling and serve to establish confidence in the independent verification sampling results rather than correlate them with the Contractor's results.

6.2.1 Smear Samples

The IVC provided smear samples to the GJO Analytical Laboratory for measurement and analysis. Smear sample media was reserved by the IVC prior to the start of the independent verification of Buildings 727, 782, and 783. A series of these were assigned as "blanks" and a second series of smears was spiked with three different concentrations of an alpha emitting transuranic isotope of the nuclide mix identified as a contaminant of concern for the 779 Cluster.

As with the spikes prepared for the Contractor, the spikes were not certified as containing traceable concentrations of the nuclide added. Thus, the spikes do not provide a direct measure of accuracy. Instead, the spikes serve to provide a measure of confidence in the laboratory's ability to detect radioactivity and to establish a basis for subsequent comparison between the results achieved by the Contractor and those achieved by the IVC.

The IVC introduced seven blank and five spiked smears into the smear sampling batch during the independent verification survey of survey units 727-01, 727-02, 782-01, and 782-02. The entire batch of smears was then provided to the GJO Analytical Laboratory. The QC samples were packaged and identified exactly as those samples collected in the survey unit and were not distinguishable to the analyst. Because the IVC used an independent laboratory to assay smears, and because the technician collecting the field smears was not involved with preparing, handling, or counting smears, it was possible to present the QC samples along with the field samples as a double blind set.

The blank smears were prepared by wiping a clean, unaffected, and uncontaminated surface. It was then packaged individually, assigned a unique QC sample number, and physically controlled to ensure custody and integrity. The spiked smears were prepared by pipetting liquid standard concentrations onto a smear filter disc.

Spiked smears were prepared with three different quantities of radioactivity to provide a range of gross alpha radioactivity concentrations over the range expected to be encountered in the Independent verification of the Final Status Survey. The range was, again, small and near zero. The QC samples provided to the IVC's laboratory were measured and reported to the IVC (Appendix F). Table 6-4 provides a crosswalk between the IVC and GJO Analytical Laboratory assigned sample numbers and presents a summary of the cumulative results obtained by the laboratory.

From Table 6-4 it is seen that each blank smear returned results indicating no detectable radioactivity in excess of the method detection limit. Each spiked smear sample except sample 259759 yielded measurable radioactivity. They were differentiated from one another and the lowest result corresponded to the smear with the lowest spiked concentration while the highest result corresponded to the smear with the highest spiked concentration. The initial laboratory measurement of sample 259759 was 5.75 dpm with a counting error of 4.48 dpm. It is

Table 6-4. Results of the GJO Analytical Laboratory Assay of QC Smear Samples Provided by the IVC

IVC QC Sample ID#	IVC Transfer Sample ID#	Laboratory Assigned Sample ID#	Sample Type	Reported Results (Gross α , dpm) ^a	
				MDA	Measured Activity
NDL 290	SMR0000260	263395	Spike	5.33	24.05
NDL 292	SMR0000261	263396	Spike	5.41	54.84
NDL 294	SMR0000262	263397	Spike	5.49	96.51
NDL 295	SMR0000593	258235	Spike	5.17	5.68
NDL 296	SMR0000168	261284	Spike	4.88	5.00
NDL 297	SMR0000592	258234	Spike	5.19	15.81
NDL 298	SMR0000169	261285	Spike	5.00	18.98
NDL 299	SMR0000591	258233	Spike	5.35	53.92
NDL 300	SMR0000170	261286	Spike	5.11	41.54
SMR0000594	SMR0000594	258236	Blank	5.13	0 ^b
SMR0000595	SMR0000595	258237	Blank	5.17	0 ^b
SMR0000596	SMR0000596	258238	Blank	5.11	0 ^b
259725	SMR0000167	261283	Blank	4.88	0 ^b
259726	SMR0000166	261282	Blank	4.91	0 ^b
259727	SMR0000165	261281	Blank	4.91	0 ^b
259728	SMR0000591	263362	Blank	5.30	0 ^b
259729	SMR0000592	263363	Blank	5.34	0 ^b
259730	SMR0000264	264867	Blank	4.67	0 ^b
259731	SMR0000451	264942	Blank	4.62	0 ^b
259732	SMR0000452	264943	Blank	4.65	0 ^b
259733	SMR0000598	263827	Blank	4.73	0 ^b
259734	SMR0000599	263828	Blank	4.66	0 ^b
259735	SMR0000454	264974	Blank	4.66	0 ^b
259736	SMR0000455	264975	Blank	4.65	0 ^b
259737	SMR0000456	264976	Blank	4.68	0 ^b
259738	SMR0000599	261638	Blank	4.91	0 ^b
259739	SMR0000453	264944	Blank	4.66	0 ^b
259755	SMR0000164	261280	Spike	4.88	5.77
259756	SMR0000598	261639	Spike	4.97	7.30
259757	SMR0000597	261640	Spike	4.91	6.55
259758	SMR0000596	261641	Spike	4.91	7.33
259759	SMR0000263	264837	Spike	4.62	0 ^b
259760	SMR0000262	264836	Spike	4.79	26.62
259761	SMR0000163	261279	Spike	4.86	23.71
259762	SMR0000266	264869	Spike	4.82	14.02
259763	SMR0000593	263364	Spike	5.39	25.85
259764	SMR0000594	263365	Spike	5.46	41.23
259765	SMR0000595	263361	Spike	5.39	35.82
259766	SMR0000265	264868	Spike	4.84	46.17
259767	SMR0000261	264835	Spike	4.79	38.66
259768	SMR0000597	263826	Spike	4.93	52.04
259769	SMR0000162	261278	Spike	5.13	56.34

^aThe analytical report presented results in pCi per sample. The results have been converted to dpm for presentation in this table. Since the smears were collected over a 100 cm² area, the results in dpm are equivalent to dpm/100 cm².

^bThe laboratory formally reported values as less than the detection limit (<MDA) but provided the raw supporting data in the complete analytical report. Each of the blank QC samples resulted in a negative net count rate.

The GJO Analytical Laboratory counted the smears with a Canberra low background automated scaler, model 2404 smear counter. The measured background was 0.097 cpm over 60 minutes. Sample count time was 6 minutes. The alpha efficiency was established at 21.39 percent.

likely that a significant fraction of the total activity deposited migrated to a depth in the smear matrix that the activity was attenuated by the sample media itself.

Again, no statement can be made about the accuracy of the results reported by the IVC's laboratory subcontractor but results were in line with those expected. The fact that the GJO Analytical Laboratory apparently used longer counting times than did the Contractor when measuring smears adds weight to the possibility that insufficient counting time may be at the root of the disparity in the results on QC smear samples reported by the Contractor.

As reported in the IVC Sampling and Survey Report, Building 729 (DOE 1999b) several smear samples submitted to the GJO Analytical Laboratory and to the Contractor were disposed of by the laboratories before they could be collected and provided to the other laboratory for a cross comparison of laboratory measurements. To remedy this situation, measured sets of QC samples (one for the Contractor and the other for the IVC) were prepared by the GJO Analytical Laboratory and were introduced to the Contractor's and IVC's sampling protocol. This provided a cumulative cross comparison of the relative accuracy of the instruments and methods employed to assay smears.

Aside from the QC measures interjected by the IVC blind to the laboratory, the independent verification sampling benefits from the internal quality control applied to the measurement process within the laboratory. Three measurement quality controls are employed for each batch of smears. The laboratory inserts a preparation blank (PB), a laboratory control sample (LCS) and a continuing calibration verification (CCV) for each batch of 21 smears. In this case, because each batch was larger than 21 smears, eight sets of laboratory initiated QC measurements were made. Table 6-5 summarizes the internal QC measurements made for the smears from survey units 727-01, 727-02, 782-01, and 782-02.

The internal QC data presented in Table 6-5 shows excellent agreement with the results expected.

6.2.2 Surface Media Samples

Stage II QC samples for the surface media sample sets are presented in Table 6-2. In addition to the Stage II QC samples, the IVC's laboratory performed internal quality control measurements to assess the quality of the data produced. Three measurement quality controls were employed for each of the three element groups (Am, Pu, U) processed for each survey unit. The laboratory inserted one PB, one LCS, and processed a duplicate of one randomly selected field sample for each sample batch. In all, there were 15 PB, 15 LCS, and five duplicate measurements made. Table 6-6 summarizes the PBs QC measurements made. Table 6-7 summarizes the LCS measurements and Table 6-8 presents the duplicate sample measurements. A regression analysis of the cumulative laboratory measurements was performed to assess the comparability between the first and duplicate measurements and is graphically presented in Figure 6-1.

Table 6-5. Results of the IV Laboratory Internal QC Measurements for Smear Samples

QC Sample Type	Expected Results	MDA	Measured Activity
	(Gross α , dpm)		
Preparation Blank	<MDA	4.64	0.33
Preparation Blank	<MDA	4.64	-0.42
Preparation Blank	<MDA	4.66	-0.42
Preparation Blank	<MDA	4.68	-0.42
Preparation Blank	<MDA	4.84	7.79 ^a
Preparation Blank	<MDA	4.71	-0.44
Preparation Blank	<MDA	4.66	-0.42
Preparation Blank	<MDA	4.64	0.33
Laboratory Control Sample	475	8.57	423
Laboratory Control Sample	475	8.46	419
Laboratory Control Sample	475	8.37	440
Laboratory Control Sample	475	8.44	410
Laboratory Control Sample	475	8.19	454
Laboratory Control Sample	475	8.68	448
Laboratory Control Sample	475	8.52	451
Laboratory Control Sample	475	8.57	423
Continuing Calibration Verification	2,220	22.27	2,182
Continuing Calibration Verification	2,220	22.04	2,210
Continuing Calibration Verification	2,220	22.00	2,265
Continuing Calibration Verification	2,220	22.02	2,221
Continuing Calibration Verification	2,220	22.24	2,343
Continuing Calibration Verification	2,220	22.27	2,294
Continuing Calibration Verification	2,220	22.36	2,165
Continuing Calibration Verification	2,220	22.27	2,182
The analytical report presented results in pCi per sample. The results have been converted to dpm for presentation in this table. Since the smears were collected over a 100 cm ² area, the results in dpm are equivalent to dpm/100 cm ² .			
^a The uncertainty of this measurement is ± 5.04 dpm.			

Table 6-6. Results of the IV Laboratory Internal Blank QC Measurements for Surface Media Samples

Preparation Blank QC Sample (PB)	Expected Results	MDA	Measured Activity
	dpm / sample		
Am-241	<MDA	0.02	0.04 ^a
Am-241	<MDA	0.01	0.03 ^a
Am-241	<MDA	0.04	0.03
Am-241	<MDA	0.04	0.07 ^a
Am-241	<MDA	0.03	0.03
Pu-238	<MDA	0.03	0.01
Pu-238	<MDA	0.02	-0.003
Pu-238	<MDA	0.04	-0.004
Pu-238	<MDA	0.04	0.006
Pu-238	<MDA	0.02	0.007
Pu-239/240	<MDA	0.04	0.01
Pu-239/240	<MDA	0.02	0.009
Pu-239/240	<MDA	0.04	0.002
Pu-239/240	<MDA	0.05	0.01
Pu-239/240	<MDA	0.02	0.02
U-234	<MDA	0.04	0.007
U-234	<MDA	0.04	0.005
U-234	<MDA	0.04	0.02
U-234	<MDA	0.04	0.04
U-234	<MDA	0.04	0.02
U-235	<MDA	0.04	0.009
U-235	<MDA	0.05	-0.01
U-235	<MDA	0.04	0.005
U-235	<MDA	0.06	0.004
U-235	<MDA	0.05	0.009
U-238	<MDA	0.04	0.02
U-238	<MDA	0.04	0.02
U-238	<MDA	0.04	0.02
U-238	<MDA	0.03	0.03
U-238	<MDA	0.04	0.02

^aThe error in the reported result includes the MDA for the measurement.

Table 6-7. Results of the IV Laboratory Internal LCS QC Measurements for Surface Media Samples

Laboratory Control QC Sample (LCS)	Expected Results	MDA	Measured Activity
	pCi/mL (Am and Pu)		pCi/L (U)
Am-241	4.74	0.02	4.70
Am-241	4.74	0.05	4.82
Am-241	4.74	0.03	4.47
Am-241	4.74	0.08	4.83
Am-241	4.74	0.04	4.80
Pu-238	10.67	0.05	10.78
Pu-238	10.67	0.05	10.50
Pu-238	10.67	0.06	11.40
Pu-238	10.67	0.08	10.66
Pu-238	10.67	0.05	10.40
Pu-239/240	10.5	0.07	10.74
Pu-239/240	10.5	0.06	10.30
Pu-239/240	10.5	0.07	11.35
Pu-239/240	10.5	0.09	10.35
Pu-239/240	10.5	0.07	10.81
U-234	16.6	0.11	16.78
U-234	16.6	0.12	15.04
U-234	16.6	0.08	16.27
U-234	16.6	0.07	16.10
U-234	16.6	0.11	15.58
U-235	0.77	0.11	0.88
U-235	0.77	0.13	1.01
U-235	0.77	0.07	0.97
U-235	0.77	0.08	0.75
U-235	0.77	0.13	1.00
U-238	16.6	0.09	16.32
U-238	16.6	0.08	16.49
U-238	16.6	0.08	16.63
U-238	16.6	0.07	15.39
U-238	16.6	0.08	16.37

The units reported for the LCS measurements are different from those used in the rest of the analytical report. The selection of units of pCi/mL and pCi/L was based on convenience since the known value of the standard used is reported in pCi/mL and pCi/L. The function and utility of the LCS sample (comparing a measurement result with a known standard) are not compromised by using units other than those used to report sample results.

The Internal QC data presented in Tables 6-5, 6-6, and 6-7 provide substantial indication that the data quality achieved in the surface media sample analysis is excellent.

Table 6-8. Results of the IV Laboratory Internal Duplicate QC Measurements for Surface Media Samples

Duplicate QC Samples Lab Sample ID#	Measured Activity (dpm/sample)					
	Am-241	Pu-238	Pu-239/240	U-234	U-235	U-238
264775	1.72 ^a	0.22 ^a	0.52 ^a	26.33	1.93 ^a	26.77
264775D	2.5 ^a	-0.16 ^a	1.02 ^a	22.87	2.35 ^a	22.87
264789	2.2 ^a	0.30 ^a	0.60 ^a	28.33	1.73 ^a	28.55
264789D	2.9 ^a	0.25	1.86 ^a	31.50	1.85 ^a	27.32
264876	2.38 ^a	0.08 ^a	0.47 ^a	26.33	0.55	24.30
264876D	0.9 ^a	0.29 ^a	0.07 ^a	27.77	3.26	29.21
264896	0.81	-0.06 ^a	0.50 ^a	15.36	2.06 ^a	14.61
264896D	1.05	0.17 ^a	0.90 ^a	16.51	1.13 ^a	19.99
264900	1.36 ^a	0.30 ^a	0.03 ^a	40.22	1.79	38.10
264900D	0.7 ^a	0.03 ^a	0.51 ^a	42.19	2.12	43.29

^aEither the reported value is less than the MDA for the analysis or the error in the reported result includes the MDA. In this case, reproducibility between duplicate samples is not achievable with high confidence since relative error is high at sample concentrations near the MDA. That the duplicate samples yield results, which are consistently at or near the MDA for the analysis provides evidence, in a qualitative sense, that duplicate measurements are comparable.

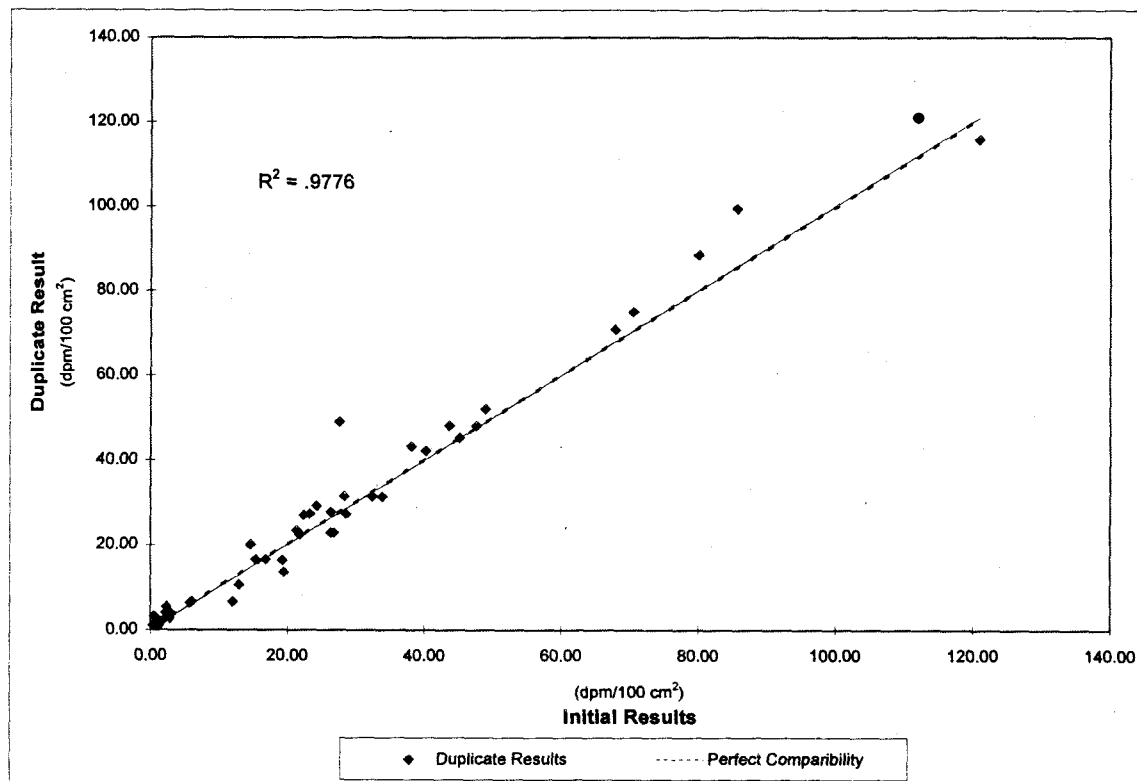


Figure 6-1. Comparison of Duplicate Alpha Isotopic Sample Analysis Results Linear Regression Fit Plot

6.2.3 Direct Static Measurements

Two sets of data collected by the IVC are pertinent to the assessment of direct static surface measurement data quality. They are replicate field measurement data and instrument response check data.

6.2.3.1 Replicate Field Measurements

The second of the two data sets contains the replicate measurements periodically made over the duration of the sampling period. In all, 17 replicate measurements were made in survey units 727-01, 727-02, 782-01, and 782-02. Table 6-9 summarizes the cumulative paired replicate measurement results collected from survey units 729-01, 779-04, 779-17, 779-21, 779-23, 779-35, 727-01, 727-02, 782-01, and 782-02. A regression analysis was performed to assess the comparability between the initial and replicate measurements and is graphically presented in Figure 6-2.

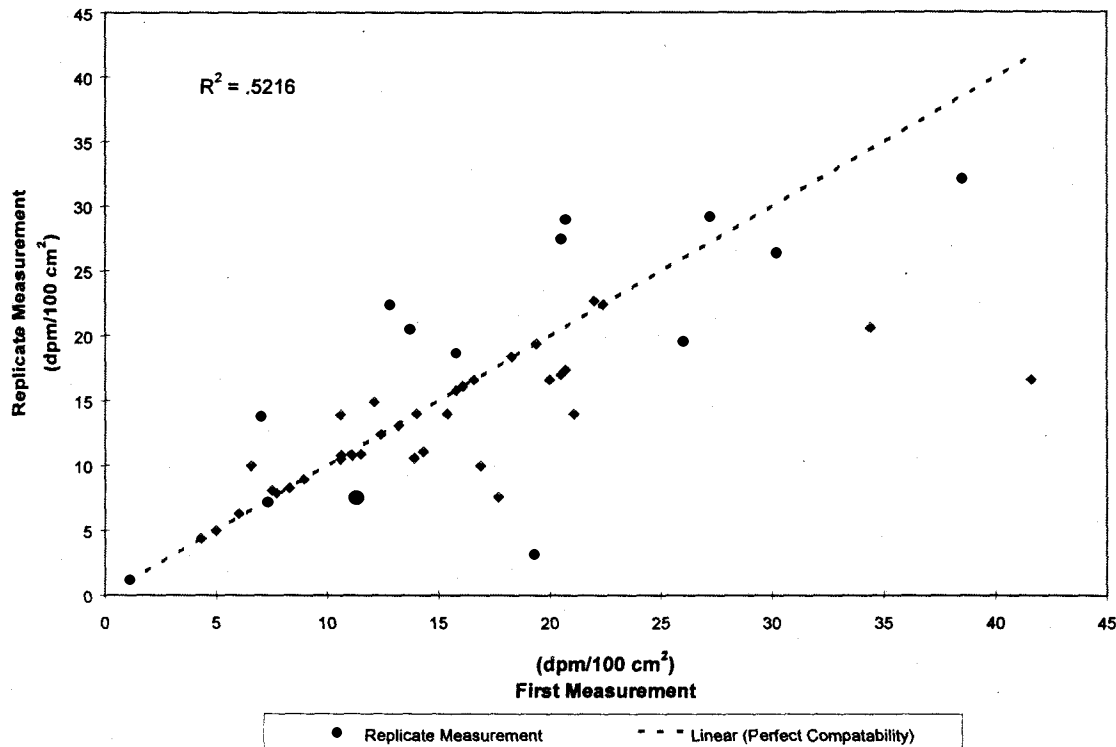


Figure 6-2. Comparison Between Replicate Direct Static Measurements
Linear Regression Fit Plot

6.2.3.2 Instrument Response Check Data

The first of the two data sets used to present the quality of direct static surface measurements is the response of the instruments (E600 with a HP-100 probe) to a planar source with a known amount of radioactivity. The source used was the same source used by the Contractor. It is an anodized surface source containing 2,398 dpm of Pu-239 radioactivity. The source was manufactured and certified to be NIST traceable by AEA Technology and assigned a unique ID# GM-785 (see copy of manufacturer's certification in Appendix B).

Prior to initiating a survey each day, periodically (≈every 2 hours), and at the end of a survey each day, the survey instrument in use was used to make a measurement on the known concentration source. The data sheets are provided for the probe used by the IVC during the

Table 6-9. Results of Replicate Direct Static Surface QC Measurements

Sample Location	Measured Activity(dpm/100 cm ²)	
	Initial Measurement	Replicate Measurement
IVP0000104	11.5	10.9
IVP0000111	7.5	8.1
IVP0000118	26.0	19.6
IVP0000119	5.0	5.0
IVP0000122	6.0	6.3
IVP0000125	27.2	29.2
IVP0000128	12.1	14.9
IVP0000129	30.2	26.4
IVP0000135	13.2	13.1
IVP0000136	7.0	13.8
IVP0000149	21.1	14.0
IVP0000152	20.5	17.0
IVP0000153	34.4	20.6
IVP0000155	10.6	10.8
IVP0000159	16.1	16.1
IVP0000176	38.5	32.1
IVP0000182	19.3	3.2
IVP0000187	12.8	22.4
IVP0000194	22.4	22.4
IVP0000206	16.60	16.60
IVP0000212	20.70	29.00
IVP0000218	10.60	13.90
IVP0000226	41.40	16.60
IVP0000236	20.50	27.50
IVP0000242	14.30	11.10
IVP0000248	13.70	20.50
IVP0000254	10.60	10.50
IVP0000259	17.70	7.59
IVP0000276	8.28	8.28
IVP0000282	12.40	12.40
IVP0000288	6.57	10.00
IVP0000294	20.00	16.60
IVP0000299	16.90	10.00
IVP0000386	11.4	7.4
IVP0000392	8.94	8.97
IVP0000401	7.31	7.20
IVP0000407	4.31	4.38
IVP0000356	15.8	18.7
IVP0000362	22.0	22.7
IVP0000368	15.4	14.0
IVP0000374	15.8	15.8
IVP0000379	19.4	19.4
IVP0000306	13.9	10.6
IVP0000312	11.1	10.8
IVP0000318	1.1	1.2
IVP0000324	7.7	7.9
IVP0000426	14.01	14.02
IVP0000432	11.2	7.7
IVP0000438	18.3	18.4
IVP0000444	20.7	17.4

independent verification of survey units 727-01, 727-02, 782-01, and 782-02. A total of 48 response check measurements were made with the probe during the survey period.

A control chart is provided for the probe for each survey unit (Figures 6-3, 6-4, 6-5, and 6-6) to graphically portray the steadfastness of the instrument's responses to the source over the sampling period. Notable is the relatively tight band within which the response checks fall. No degradation of the instrument response was observed over the period it was used indicating that the 2 hour maximum use constraint on a fresh counting gas charge is adequate and might provide justification for a longer allowable period between purge and charge cycles.

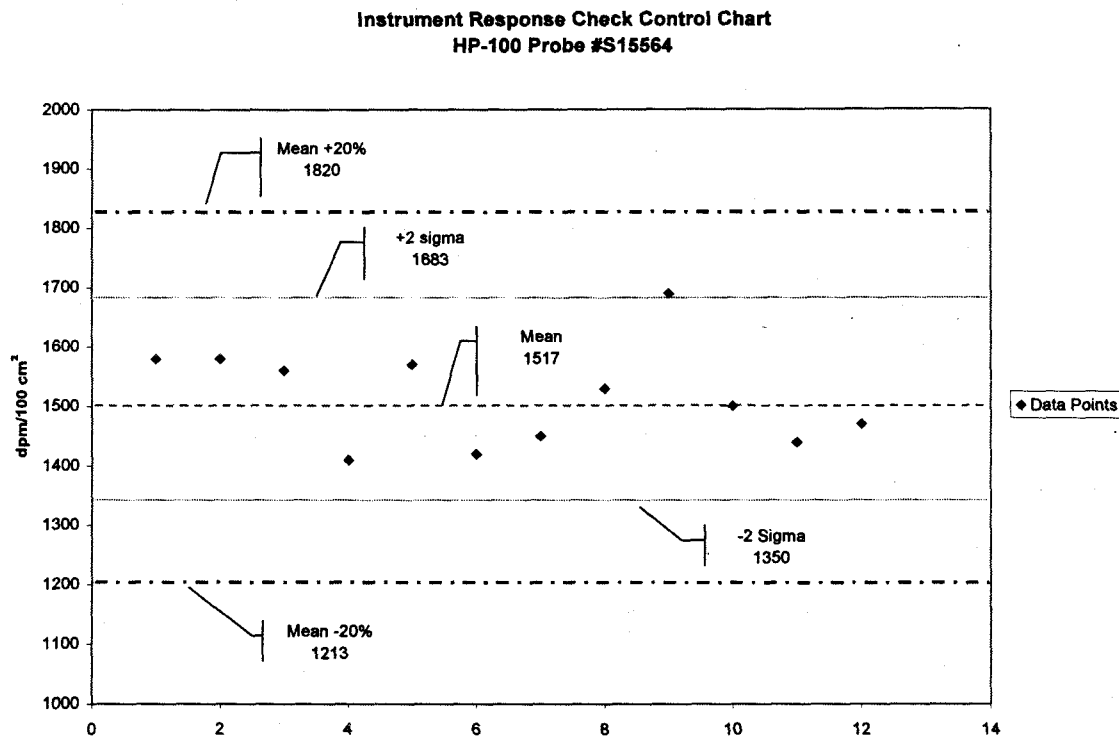


Figure 6-3. Instrument Response Check Control Chart, Survey Unit 727-01—HP-100 Probe #S15564

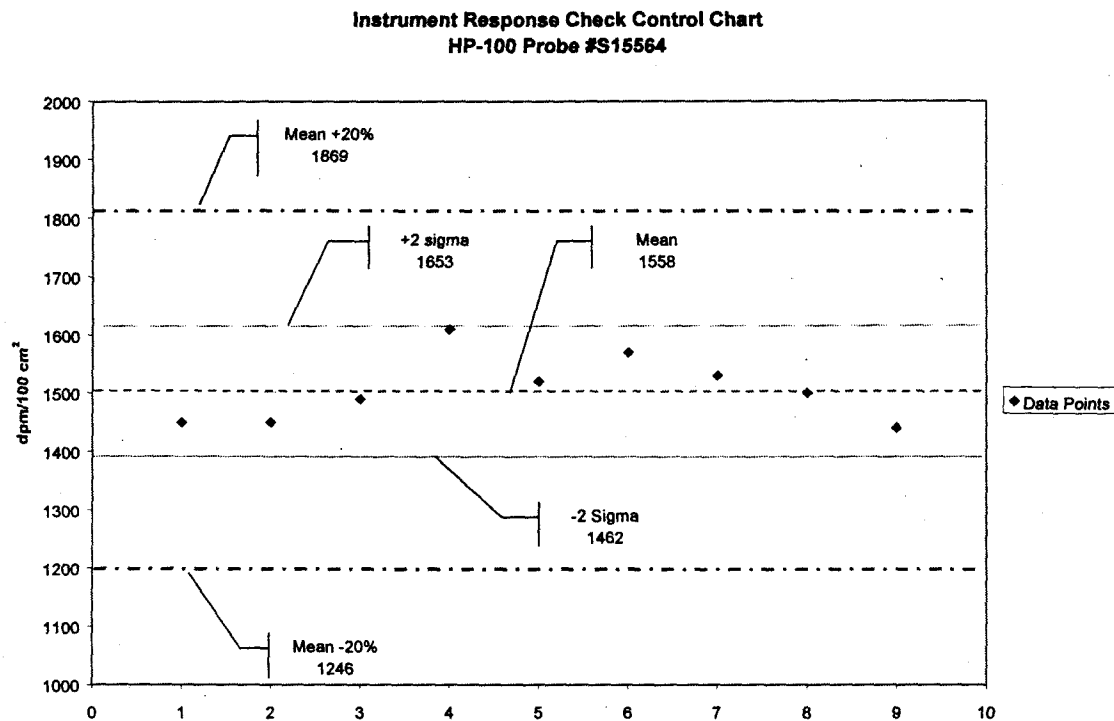


Figure 6-4. Instrument Response Check Control Chart, Survey Unit 727-02—HP-100 Probe #S15564

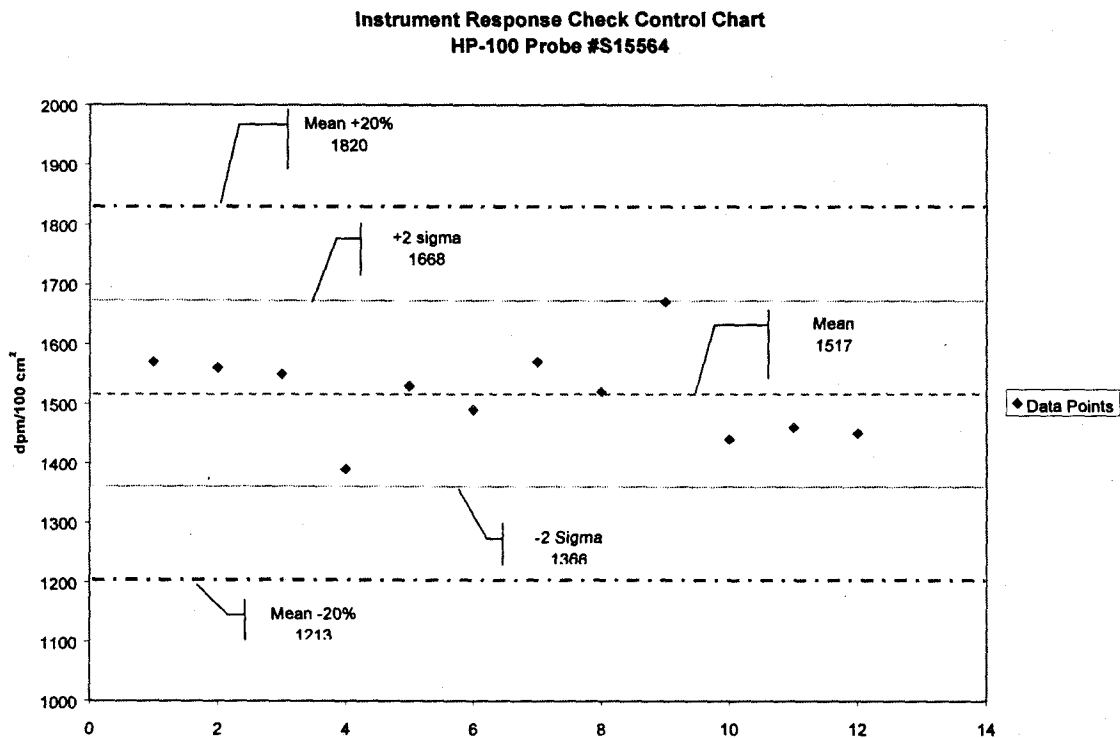


Figure 6-5. Instrument Response Check Control Chart, Survey Unit 782-01—HP-100 Probe #S15564

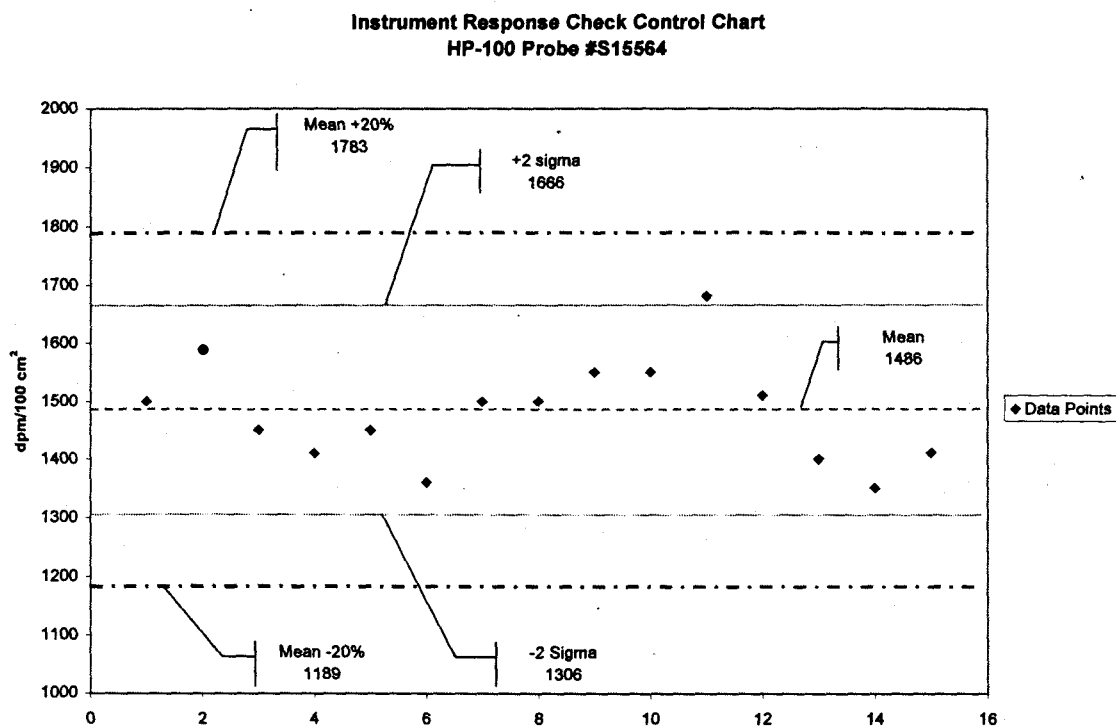


Figure 6-6. Instrument Response Check Control Chart, Survey Unit 782-02—HP-100 Probe #S15564

7.0 Data Quality Analysis

The purpose of this data quality analysis (DQA) is to evaluate the data collected from the field in light of its intended use in decision making. Decision makers should obtain an understanding of the verity of the data used in the verification process from reading this section. The DQA uses guidance from *MARSSIM* (EPA 1997), *Guidance for Data Useability in Risk Assessment* (EPA 1992), information from the IV SAP (DOE 1999a), and professional judgement.

7.1 Detection Limit Adequacy

Each of the three measurement methods used to assess the residual radioactive contamination in Buildings 727, 782, and 783 have measurement sensitivities which limit the ability of the measurement to detect and quantify radioactivity. A key concern and design element of the SAP was to assure that sufficiently low detection sensitivities were achieved. Assumptions had to be made about the environment and response of the instrumentation and preparation methods in order to estimate the detection sensitivity before the fact. Now that the measurements have actually been made, assessment of the actual detection sensitivity achieved is possible. Section 6.0 presented data which demonstrated that the detection sensitivities achieved were adequate to identify and quantify radioactivity at a fraction of the applicable limit or DCGL. The target detection sensitivity planned for in the SAP was ≈ 50 percent of the applicable DCGL. Method detection limits obtained in both the field measurements and the laboratory measurements used were adequate to compare to the associated DCGL as indicated in Table 7-1, and met or exceeded the data quality target for measurement sensitivity.

Table 7-1. Adequacy of Independent Verification Measurement Detection Limits

Measurement	Analytical Method	DCGL Benchmark (dpm/100 cm ²)	Detection Sensitivity Achieved (dpm/100 cm ²)			
			727-01	727-02	782-01	782-02
Average removable surface contamination concentration	Smear counting	20	≈5	≈5	≈5	≈5
Average transuranic surface contamination concentration as measured by direct surface emission.	90 Second Direct Static Surface Emission Count	100	32 ^a	43 ^a	33 ^a	40 ^a
Maximum transuranic surface contamination concentration as measured by direct surface emission.		300				
Average surface transuranic contamination concentration in and beneath surface coatings as measured by surface media sampling.	Alpha Spectroscopy	100	≈2	≈2	≈2	≈2
Maximum surface transuranic contamination concentration in and beneath surface coatings as measured by surface media sampling.		300				
Average surface uranium contamination concentration in and beneath surface coatings as measured by surface media sampling.	Alpha Spectroscopy	5,000	≈4	≈4	≈4	≈4
Maximum surface uranium contamination concentration in and beneath surface coatings as measured by surface media sampling.		15,000				
^a The detection sensitivity reported is net MDA. The adjusted gross MDA is equal to the MDA + background (39, 58, 40, and 52 dpm/100 cm ² , respectively).						

If detection limits had exceeded the DCGL metrics, then declarations based on measurements made using that method could not have been substantiated. As evidenced by comparing the decision limits as represented by the DCGLs with the MDA associated with the measurement method employed in assessing the residual contamination in Buildings 727, 782, and 783, each detection limit obtained was more than adequate to detect, observe, and make risk management decisions with confidence.

7.2 Sample Size and Statistical Power

According to the SAP, sample sizes were specified to ensure a false positive error rate (alpha error) and a false negative error rate (beta error) of no greater than 5 percent when measurement data sets were compared to the DCGL. For each sample media set—direct surface emission measurements, smears, and surface media samples—a sample size of 29 (allowing for a 20 percent contingency) was specified in the IV SAP (DOE 1999a). In the field, 116 direct surface emission measurements, 116 smears, and 69 surface media samples were actually collected from designated locations in Buildings 727, 782, and 783.

Based on the results of each of the data sets, retrospective power curves were developed. Figures 7-1 through 7-4 illustrate the power of the sign test to conclude whether the null hypothesis should be rejected by measuring the probability that a survey unit meets the DCGL. Values of both error types (Type-I and Type-II) can be derived from the power curve at any possible concentration of residual contaminant. Type-I errors (falsely concluding that the DCGL *is not exceeded* when it actually is exceeded) are those that concern the risk manager and decision maker most. The actual and critical sample size (N) are both presented for each of the four data sets evaluated. The retrospective power curve is calculated using the actual sample size obtained. The boundary of the gray region represents the concentrations between which there is insufficient power at the prescribed alpha and beta error rate, given the sample size obtained and the variability observed in the data set.

Inspection of Figure 7-1 for survey unit 727-01 illustrates that the Type-I error rate drops below 5 percent (the error rate is $1 - \text{Power}$) when the true mean surface contamination concentration is at the DCGL of 100 dpm/100 cm², the sample size is 29, and the standard deviation is 7.59 dpm/100 cm² (the actual standard deviation). Alternately, the power to reject the null hypothesis when the mean surface contamination concentration is as high as 92 dpm/100 cm² is 95 percent. The critical sample size required to provide the power necessary to meet the sampling objectives outlined in the SAP was determined to be 19. The actual sample size (29) was much higher than that required, thus the actual power was much higher than required by the sample design. Note that the estimate of the central tendency, the geometric mean, is plotted against the power curve. This concentration is significantly less than the concentration at which the power begins to wane (the lower boundary of the gray region). The power to reject the null hypothesis at the observed mean concentration in the survey unit is effectively 100 percent.

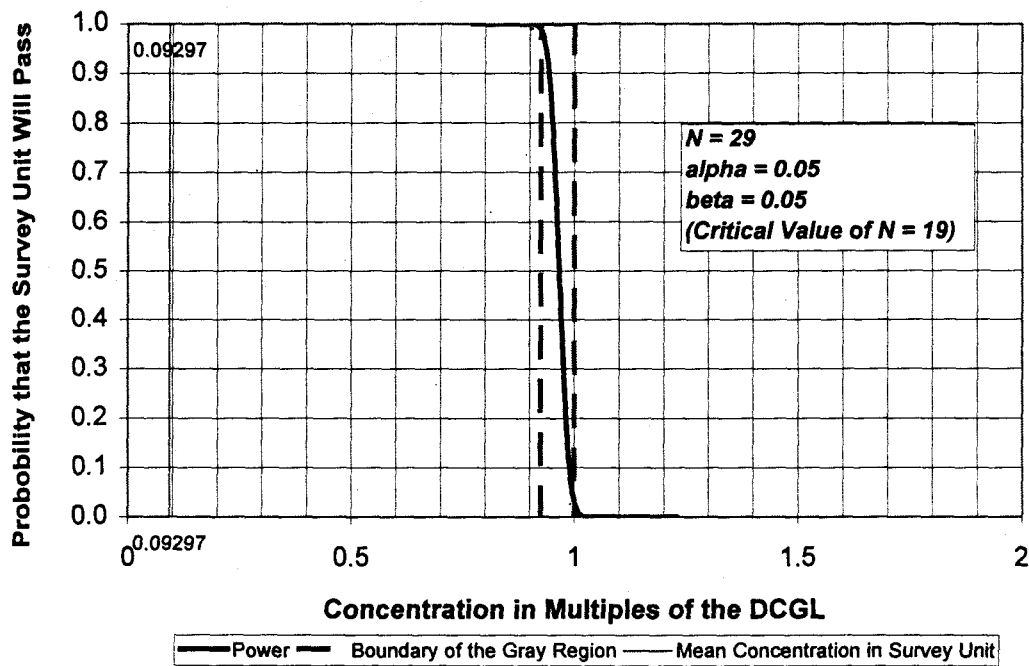


Figure 7-1. Retrospective Power of the Sign Test
 Direct Static Surface Measurements, 727-01

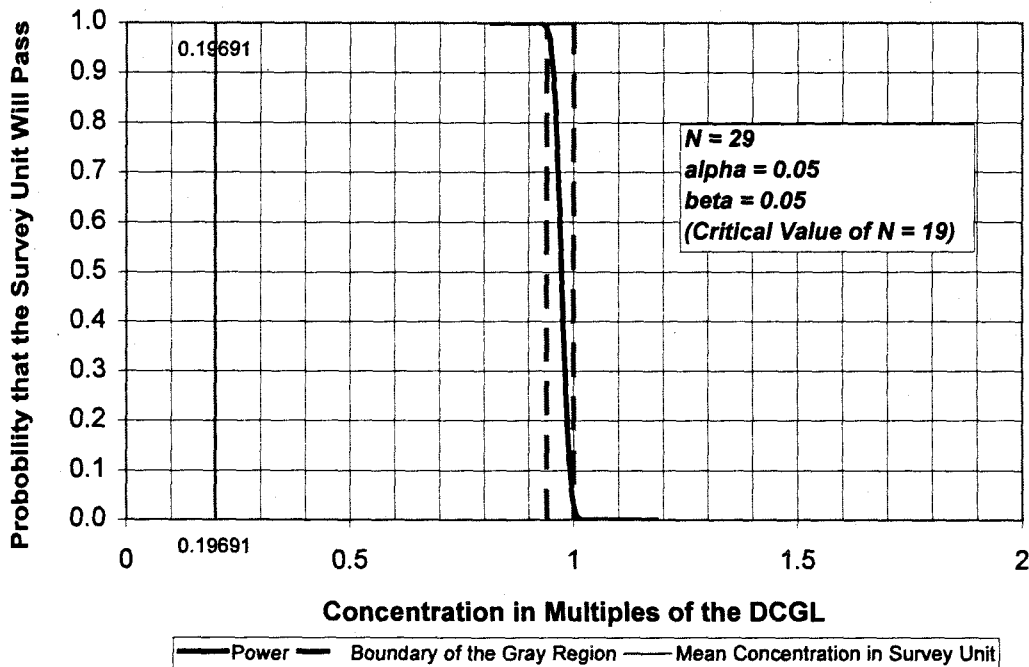


Figure 7-1 (continued). Retrospective Power of the Sign Test
 Direct Static Surface Measurements, 727-02

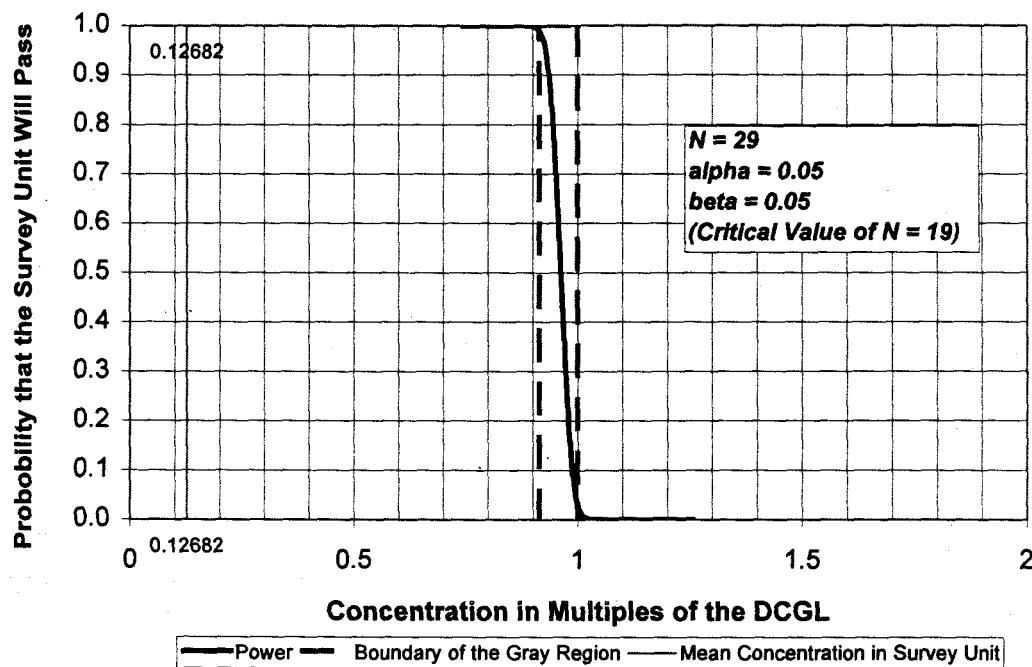


Figure 7-1 (continued). Retrospective Power of the Sign Test
Direct Static Surface Measurements, 782-01

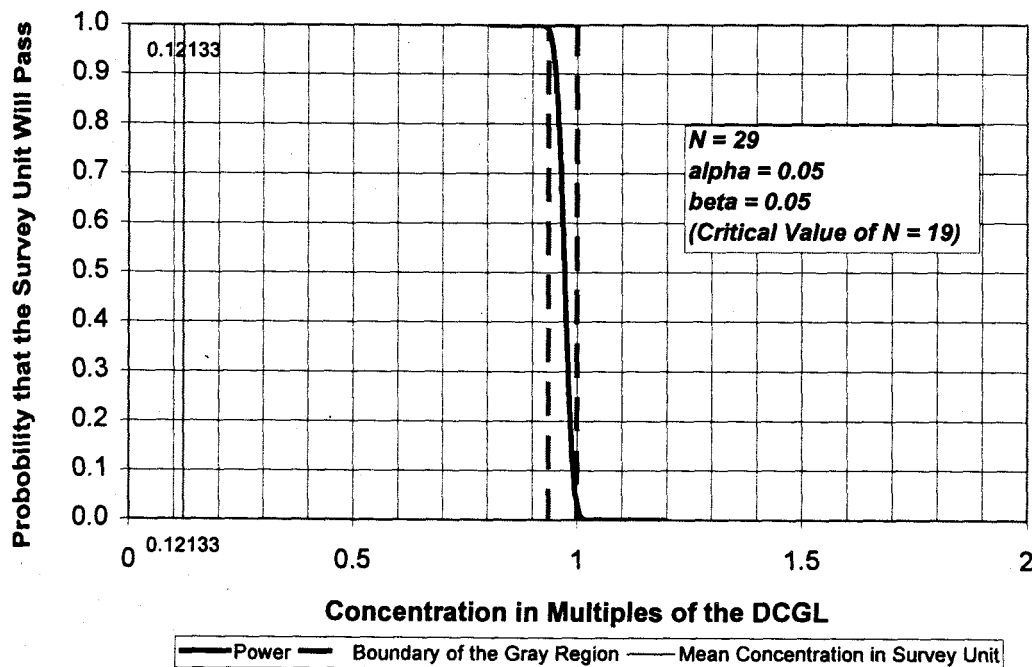


Figure 7-1 (continued). Retrospective Power of the Sign Test
Direct Static Surface Measurements, 782-02

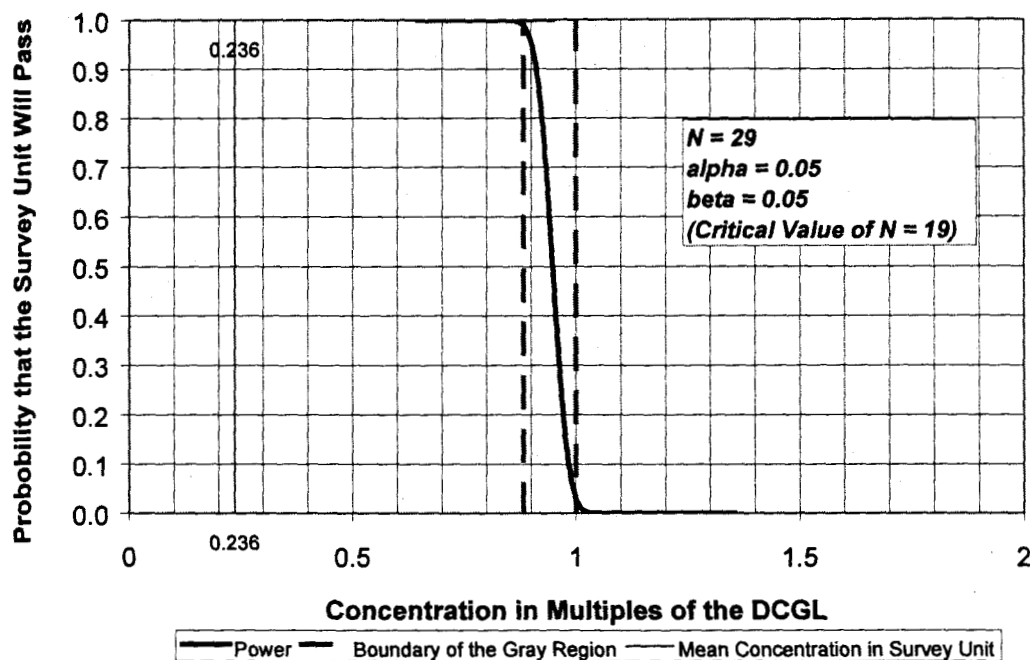


Figure 7-2. Retrospective Power of the Sign Test
Smear Sample Measurements, 727-01 and 727-02

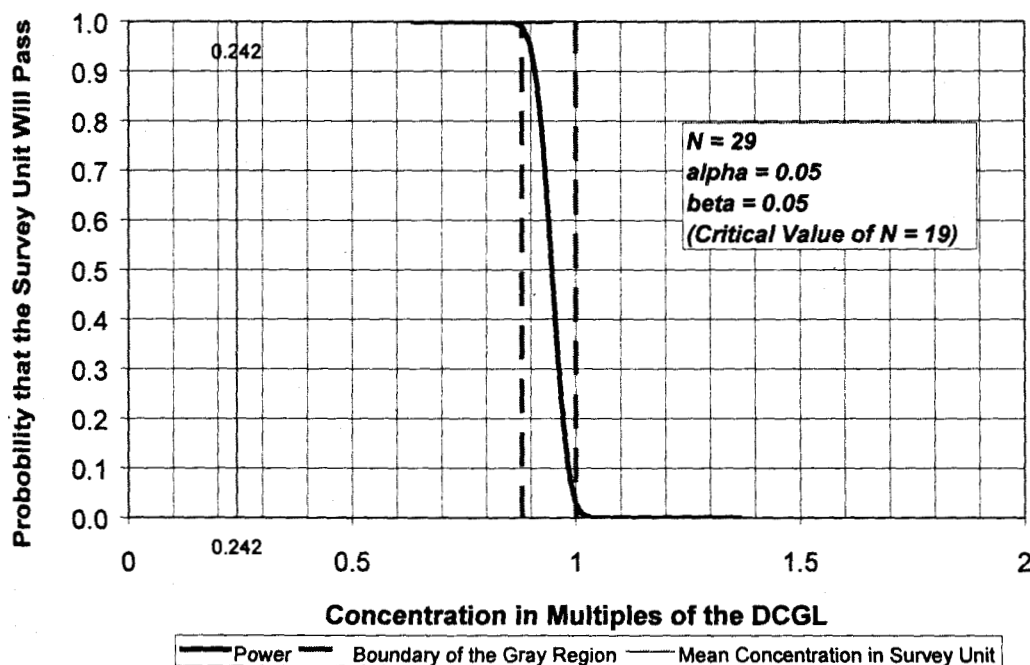


Figure 7-2 (continued). Retrospective Power of the Sign Test
Smear Sample Measurements, 782-01 and 782-02

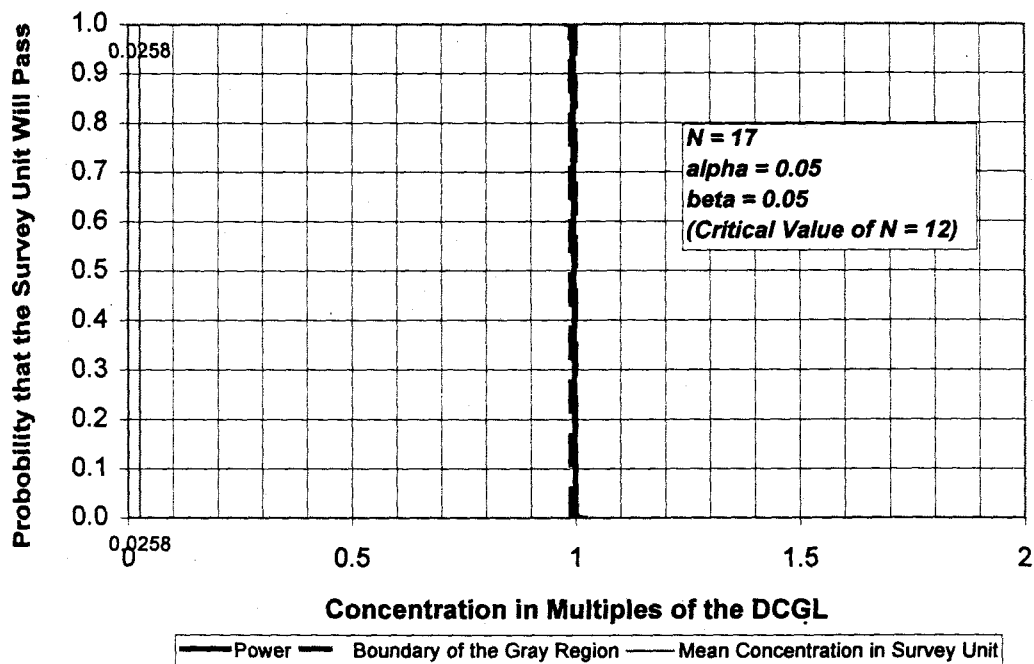


Figure 7-3. Retrospective Power of the Sign Test
Surface Media Samples/Transuranic Activity, 727-01

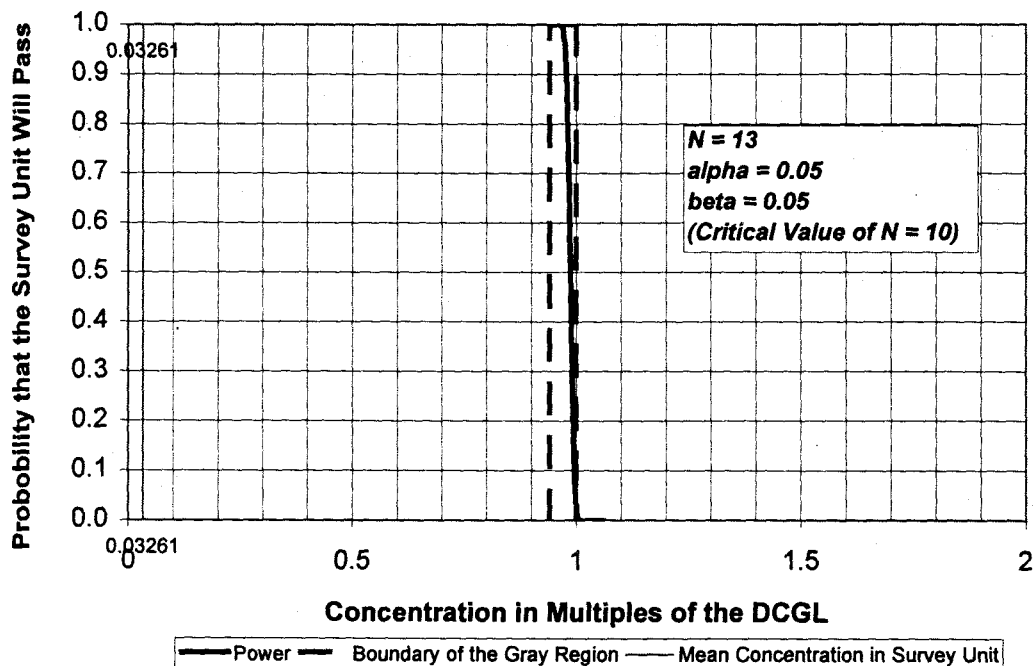


Figure 7-3 (continued). Retrospective Power of the Sign Test
Surface Media Samples/Transuranic Activity, 727-02

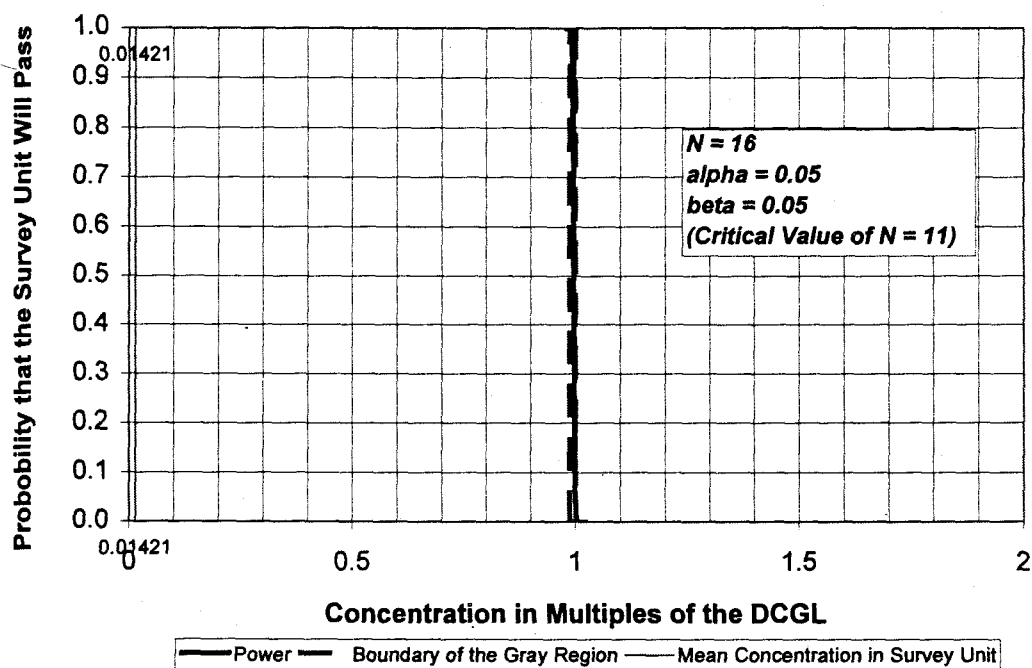


Figure 7-3 (continued). Retrospective Power of the Sign Test
 Surface Media Samples/Transuranic Activity, 782-01

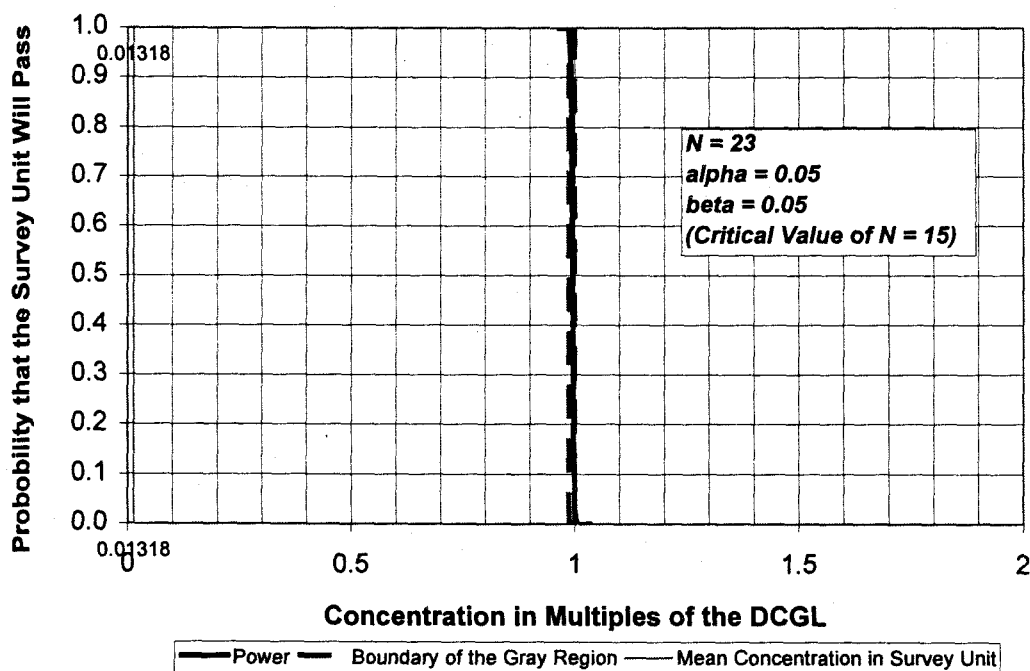


Figure 7-3 (continued). Retrospective Power of the Sign Test
 Surface Media Samples/Transuranic Activity, 782-02

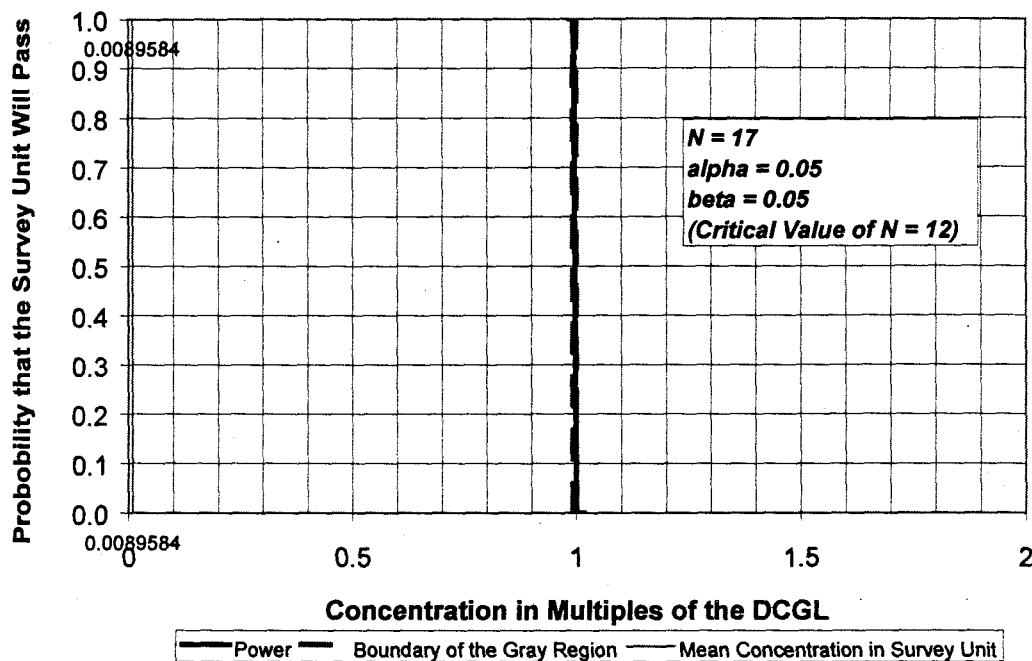


Figure 7-4. Retrospective Power of the Sign Test
 Surface Media Samples/Uranium Series Activity, 727-01

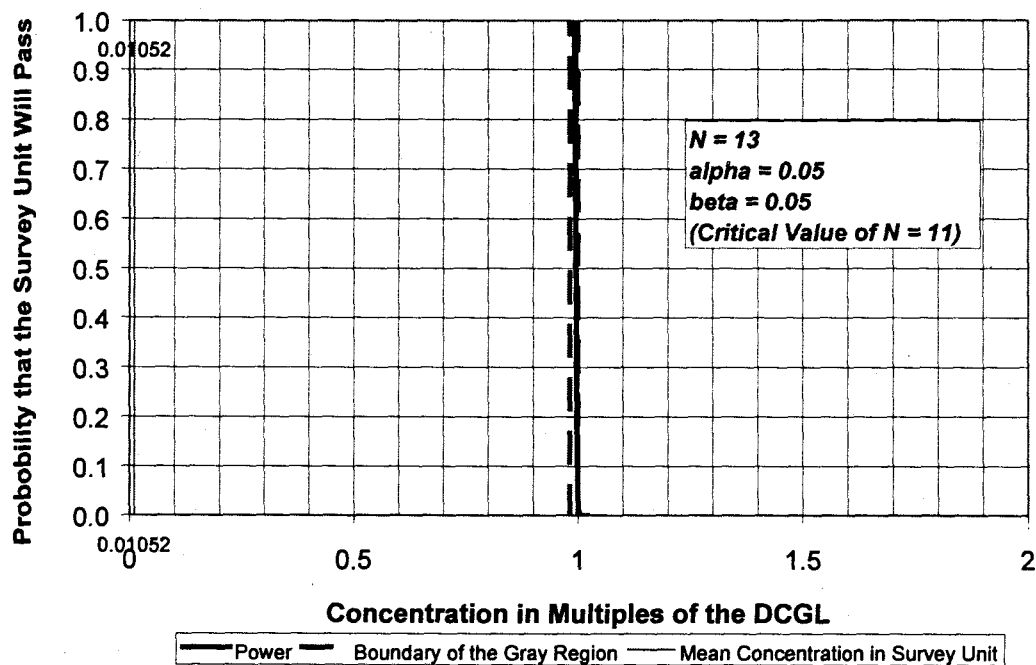


Figure 7-4 (continued). Retrospective Power of the Sign Test
 Surface Media Samples/Uranium Series Activity, 727-02

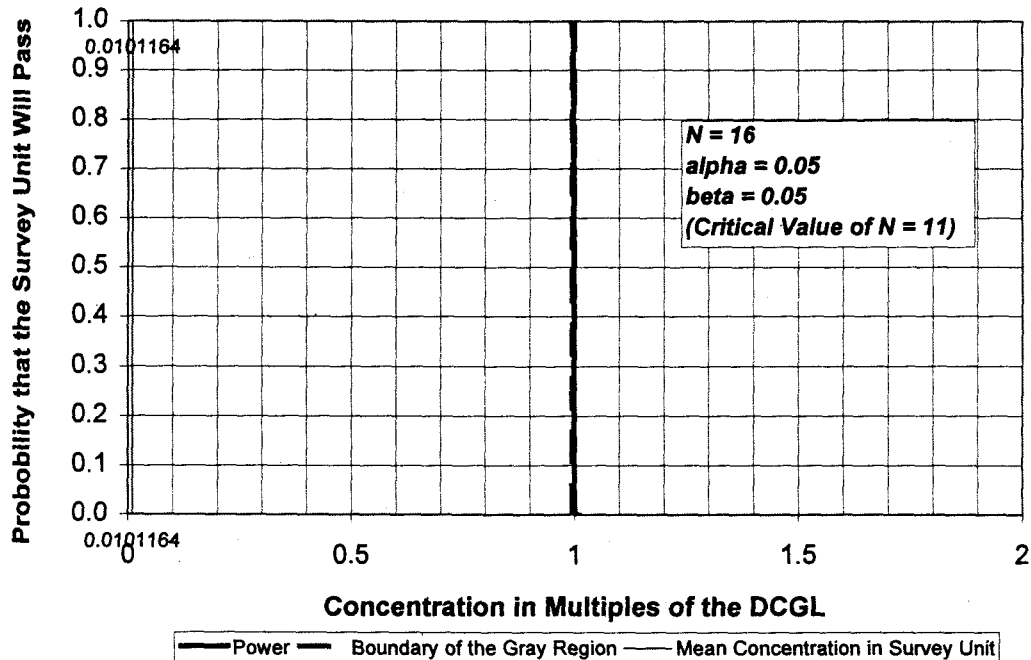


Figure 7-4 (continued). Retrospective Power of the Sign Test
 Surface Media Samples/Uranium Series Activity, 782-01

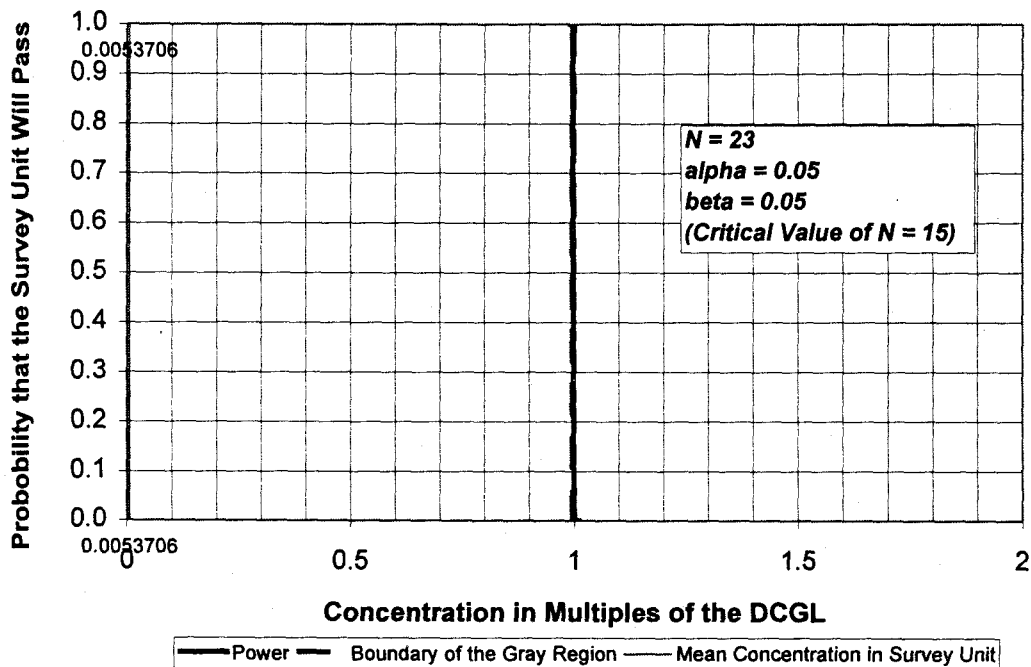


Figure 7-4 (continued). Retrospective Power of the Sign Test
 Surface Media Samples/Uranium Series Activity, 782-02

The same results are observed in Figures 7-2 through 7-4. Rigorous statistical tests of the data sets are not justified since it is known that every data point comprising each of the data sets was less than the applicable DCGL. When this occurs, the sign test will always conclude that the null hypothesis should be rejected, provided that a sufficient number of measurements have been included in the data set (i.e., actual sample size is greater than or equal to the critical sample size). Thus, risk managers can be assured that the data collected is sufficiently robust to decide that the residual surface contamination concentration in the survey unit measured is below the DCGL.

7.3 Measurement Uncertainty and Data Quality Indicators

As discussed in the IV SAP (DOE 1999a), measurement uncertainty stems from two sources: field sampling variation, and instrument/laboratory measurement variation. Of the two sources, field sampling variation was noted as the greatest contributor to overall uncertainty because of the inherent logistics of sample collection and the one-of-a-kind aspect of sampling the building. The field measurement methods used in the building survey were standard Health Physics instrument techniques and were governed by approved procedures used in the field sampling process. Laboratory procedures were also utilized by the GJO Analytical Laboratory to assess the radioactivity associated with both smear samples and surface media samples. Surface media samples were weighed prior to sample preparation to minimize error due to sample mass loss during sample preparation. An additional control feature utilized to minimize variability and error in the surface media samples was to homogenize the sample by grinding the surface veneer material removed to a fine powder. In this way, any aliquot of the sample selected for analysis could be confidently expected to yield comparable results.

As discussed in the SAP (DOE 1999a), an important activity in determining the usability of the data based on sampling is assessing the effectiveness of the sampling program (EPA 1998, EPA 1992). Data Quality Indicators (DQIs) were identified as guidelines for the DQA process to provide quantitative and qualitative measures of overall data quality and usability. For comparative purposes, Table 7-2 repeats the target DQIs from the IV SAP and summarizes the post-sampling data quality assessment.

It is important to note that the Quality Object for instrument precision (r^2 of ≈ 0.75) was not achieved due to the absence of residual contamination and high radon levels; however, the instrument precision obtained in the low background environment is determined to be adequate to meet the intent of this Quality Objective. Most of the sampling area did not contain residual contamination greater than background. When developing the SAP it was assumed that a significant amount to residual contamination above background would be present and a value of 0.75 for r^2 would be achievable. As a result of rigorous decontamination most measurement results were at or below background activity levels, thus statistical variability was high. This Quality Object will be changed to reflect a more realistic object based on the low activity levels found in the Building 779 Cluster.

Inspection of Table 7-2 indicates that the DQIs are achieved and the data is regarded as having sufficient quality to be useable for verification of the DCGL and for assessing the results and conclusions obtained by the Contractor.

7.4 Overall Quality Assurance and Quality Control

Based on the forgoing analysis and observed practices in the field, it is apparent that overall project QA/QC goals were obtained. The key technical features of the project included:

The DCGL derivation and SAP development processes were performed in accordance with EPA guidance for DQOs (EPA 1997 and EPA 1993).

Field operations were conducted in accordance with the SAP. Modifications to the sample locations which were either inaccessible or involved appreciable personnel safety hazards were made in accordance with the approved sample relocation procedure outlined in the SAP.

Data analysis was conducted as prescribed by the SAP and in general agreement with EPA guidance (EPA 1997 and EPA 1992).

There were no significant problems or incidents that would compromise the findings. The data collected from the building survey is regarded as useable.

Table 7-2. Target Data Quality Indicators and Findings

DQI	Quality Objective (DOE 1999)	Significance	Action/Remark	Finding
Completeness	90 percent completeness	Less than complete data set could decrease confidence in supporting information.	One hundred and sixteen direct surface emission measurements of the 116 scheduled were obtained (100 percent).	DQI accepted.
			One hundred and sixteen of the 116 scheduled smear samples were collected (100 percent).	DQI accepted.
			Sixty-nine of the potential 116 surface media samples were collected (60 percent). Less than 29 surface media samples were collected from each survey unit because many of the selected locations did not meet the inclusion criteria for sampling. An assessment of the <i>a posteriori</i> power provided by the surface media sample data sets provide evidence that the sample size of each survey unit is sufficient to be considered complete.	DQI accepted.
Comparability	1) Comparability between instrument efficiencies (~ ±10 percent) 2) Common or equivalent sampling procedure used. 3) Professional judgement and field observations.	Affects ability to combine data sets produced using different sampling and/or analytical methods.	No measurement data sets were combined for the independent verification of the Final Status Survey of Buildings 727, 782, and 783. Consistent methods, both sampling and analytical, were used throughout the sampling and survey process.	DQI accepted.
Representativeness	Sample allocation approach followed to ensure unbiased sample location selection and spatial distribution of the sampling locations.	Non-representativeness increases or decreases Type I error depending on the bias and results in the need to collect additional samples to improve representativeness.	Sample allocation used in the field strictly followed the approach outlined in the SAP. Two of the one hundred and sixteen sample locations selected at random had to be relocated for personnel safety or location accessibility reasons. Both of them were relocated using the relocation protocol outlined and approved in the SAP and maintained the spatial and unbiased objectives of the sample allocation objective. Each of the 116 sample locations was selected without prior knowledge and is unbiased. The sample locations selected meet the intent of the SAP design and are considered representative of conditions in the buildings. There are no analytical or measurement effects (e.g., holding times or compositing effects) affecting representativeness.	DQI accepted.

Table 7-2 (continued). Target Quality Data Indicators and Findings

DQI	Quality Objective (DOE 1999)	Significance	Action/Remark	Finding
Precision	<p>Field and laboratory processes will be governed by procedures.</p> <p>Replicate and split samples are used to assess variability as an indicator of precision.</p> <p>< 10% difference between replicate and split samples.</p> <p>Overall r^2 of ≈ 0.75 or better on paired data sets.</p> <p>Standard error of the regression estimate (SSE $\pm 10\%$).</p>	Lack of precision affects the accuracy or confidence in the accuracy of the reported results.	<p>All sampling, field measurement, and laboratory analysis processes were controlled by approved written procedures. Replicate direct static surface measurements made in the field showed adequate precision at the low count rates encountered at most sample locations (most were below the detection limit for the method).</p> <p>Regression analysis on the paired data yielded a regression coefficient of determination of 0.52 and a standard error estimate of 4.9%.</p> <p>Field instrument response checks and laboratory control standards and continuing calibration verification measurements demonstrated the precision of the laboratory analytical methods showing less than 10% error when control samples were measured more than once.</p> <p>Caution must be exercised when attempting to measure precision on replicate measurements with activity near and below the detection limit. Statistical variability at near zero activity limits the likelihood that measurements results will be precise even when sampling and analytical methods are in fact precise and suitable at concentrations approaching the DCGL.</p> <p>Overall sampling variability is another measure of precision. Quantitative metrics describing measurement precision are all acceptable. CV's range from 0.29 to 0.82 and the CI₉₅ for each data set was more than 50% below the applicable DCGL.</p>	DQI accepted.
Accuracy	<p>Field and laboratory processes will be governed by procedures.</p> <p>Response to samples containing known amounts of radioactivity should be within $\pm 10\%$.</p> <p>QC Blank samples should return results below detection limit. QC spike samples should return results indicating the presence of the radioactivity of interest.</p>	Accuracy is affected by bias and precision. A lack of accuracy can affect Type I and Type II errors depending on the bias.	All procedures were implemented. Spikes and Blanks returned expected results. Responses to samples (or sources) containing known amounts of radioactivity were consistently within $\pm 10\%$ for every analytical measurement method used. Field responses to a low-level source containing a known amount of radioactivity were consistently within the acceptable range of $\pm 20\%$. As shown above, precision was acceptable	DQI accepted.

CV = Coefficient of Variation
 CI = Confidence Interval
 r^2 = coefficient of determination

8.0 Summary and Conclusions

8.1 Independent Verification Sampling and Survey

On the basis of the analysis presented in Sections 3.0 through 7.0 of this report, the IVC has demonstrated that survey units 727-01, 727-02, 782-01, and 782-02 have met each of the compliance benchmarks, or DCGLs. These results show that residual surface radiological contamination is well below the agreed upon benchmarks for the Building 779 Cluster Decontamination and Decommissioning project applicable to Buildings 727, 782, and 783. Table 8-1 provides a summary review of the DCGLs compared to the appropriate compliance parameter. The actual reported values in Table 8-1 represent the highest measurement recorded in all four survey units for each of the metrics. The independent verification sampling and survey results are highly reliable and consistent with the field sampling and survey design. No unexpected results or trends are evident in the data. The sampling and survey results determined that residual radiological contamination in Buildings 727, 782, and 783 is very minimal and, for the most part, barely above background levels. Thus, the IVC concludes that the null hypothesis for survey units 727-01, 727-02, 782-01, and 782-02 (that residual radiological surface contamination exists in concentrations above the DCGLs) should be rejected.

Table 8-1. Comparison of Buildings 727, 782, and 783 DCGLs to Highest Observed Compliance Parameters

Metric	Surface Radioactivity (dpm/100 cm ²)			Pass/Fail
	DCGL	Actual		
		(UCL ₉₅)	Maximum	
Mean surface contamination as measured by direct surface emission	100	22.0		Pass
Maximum surface contamination as measured by direct surface emission	300		36.3	Pass
Mean removable surface contamination	20	<4.84		Pass
Mean total transuranic surface contamination on and beneath a surface with a surface coating as measured by surface media sample	100	3.3		Pass
Maximum total transuranic surface contamination on and beneath a surface with a surface coating as measured by surface media sample	300		8.2	Pass
Mean total uranium series surface contamination on and beneath a surface with a surface coating as measured by surface media sample	5000	53		Pass
Maximum total uranium series surface contamination on and beneath a surface with a surface coating as measured by surface media sample	15,000		121	Pass

8.2 Independent Review of the Contractor's Final Status Survey Report and Conclusions

The IVC has completed a comprehensive review of the Contractor's Closeout Radiological Survey Report for Buildings 727, 782, and 783 (RMRS 1999c) and concurs with the conclusion reached by the Contractor—that each survey unit in Buildings 727, 782, and 783 met the applicable DCGLs and that the building should be released from further radiological controls.

9.0 References

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——, 1999b. *779 Cluster Final Survey Breakdown Structure*, Revision 0, Golden, Colorado, May.

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———, 1992. *Manual for Conducting Radiological Surveys in Support of License Termination*, Draft Report for Comment, NUREG/CR-5849, Office of Nuclear Regulatory Research, Washington, D.C.

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Building 782

Random Selection Program to Select Survey Units for IV

Two survey units are to be selected for this building: One exterior and one interior.

CTRL - ALT - F9 to recalculate

Random Number Selected =	5
Random Number Selected =	1

Building 782

Survey Unit ID#

Class (1, 2, 3) Weighting

782-01	(interior)	2	3	1	782-01
782-02	(exterior walls)	2	3	2	782-01
782-03	(exterior roof)	2	3	3	782-01
				4	782-02
				5	782-02
				6	782-02
				7	782-03
				8	782-03
				9	782-03
			9		

NOTE: Survey Unit 782-01 was changed by the Contractor to include the exterior walls and roof. Survey Unit 782-02 was changed to include the Plenum Area (interior).

Random Selection Program to Select Survey Units for IV

Two survey units are to be selected for this building: One exterior and one interior. Since only two survey units have been identified for this building group, both will be surveyed.

CTRL - ALT - F9 to recalculate

Random Number Selected =	1
Random Number Selected =	3

Buildings 783, 727, 780, 780A, 780B

Survey Unit ID#

Class (1, 2, 3) Weighting

727-01	(interior)	3	1	1	727-01
727-02	(exterior)	2	3	2	727-02
				3	727-02
				4	727-02



AEA Technology
QSA Inc.

40 North Avenue

Burlington, MA 01803

Telephone (781) 272-2000

Telephone (800) 815-1383

Facsimile (781) 273-2216

CERTIFICATE OF CONFORMANCE

TO: MACTEC-ERS, LLC
For the U.S. DoE
2597 B-3/4 Road
Grand Junction, CO 81503

This is to certify that the items listed below, which were ordered against purchase order number 21764, meet AEA Technology QSA Inc's catalogue specifications and that they comply with the requirements specified in the purchase order. AEA Technology QSA Inc certifies that all materials were produced and controlled in accordance with our documented Quality Assurance Program.

<u>Item No.</u>	<u>Quantity</u>	<u>Product Code</u>	<u>Description</u>	<u>Serial No.</u>
1	1	PIR07012	Pu-239 Anodized aluminum source, AD-100x150mm, OD-120x170mm, NIST traceable*, Overall uncertainty +/-6% at 95% confidence level	GM-785

*Calibration test records are on file in our measurement laboratory and are available for contractor's review, if required.

Ross Jones
Technical Sales Manager

13th April 1999

DEUTSCHER KALIBRIERDIENST **DKD**

Kalibrierlaboratorium für Meßgrößen der Radioaktivität
Calibration laboratory for measurements of radioactivity

AKKREDITIERT DURCH DIE

PHYSIKALISCH-TECHNISCHE BUNDESANSTALT (PTB)



AEA Technology QSA GmbH

Postfach 58 42 Gieselweg 1
D-38049 Braunschweig D-38110 Braunschweig

Tel. +49 (0) 5307 932-0

Fax +49 (0) 5307 932-194

Source no. GM 785

Kalibrierschein
Calibration Certificate

Kalibrierzeichen
Calibration mark

05872
DKD-K- 06501
99-03

Gegenstand
Object

Alpha Wide Area Reference Source

Hersteller
Manufacturer

AEA Technology QSA GmbH

Typ
Type

PIR07012

Strahler-Nr.
Source number

GM 785

Auftraggeber
Customer

AEA Technology QSA, Inc.
USA-Burlington, MA 01803

Auftragsnummer
Order No.

110746

Anzahl der Seiten des Kalibrierscheines
Number of pages of the certificate

2

Referenzdatum
Reference date

23 February 1999

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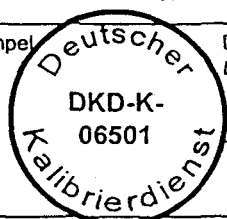
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Stempel
Seal



Datum
Date

1 March 1999

Leiter des Kalibrierlaboratoriums
Head of the calibration laboratory

Dr. Thieme

Stellvertreter
Deputy

Schott








Bearbeiter
Person in charge

Feist

Linke / Schott / Schüler

VEHICLE BACKGROUND DATA SHEET

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-D1 Date: 02-02-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Affix Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID	GROSS Instrument Reading (cpm/100 cm ²)	Comments (Include reason for background measurement)
 BACKGROUND	1525	Direct Static Background Measurement	1.5 Minute	S15564 #109 06/30/00	7.93	START OF Shift
 BACKGROUND	1528	Direct Static Background Measurement	1.5 Minute		11.34	
 BACKGROUND	1530	Direct Static Background Measurement	1.5 Minute		7.74	
 BACKGROUND	1652	Direct Static Background Measurement	1.5 Minute		8.23	END OF Shift
 BACKGROUND	1654	Direct Static Background Measurement	1.5 Minute		8.32	
 BACKGROUND	1656	Direct Static Background Measurement	1.5 Minute		4.75	
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			

Form IVP-1001, July 1999








Supervisory Review: A. Samkin Signature: A. Samkin Date: 2/2/00
 File Index Number: _____

INDEPENDENT VERIFICATION INSTRUMENT BACKGROUND DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-01 Date: 02/03/00

Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03/23/00

Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Alik or Recorder Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (dpm/100cm ²)	Comments: (Include reason for background measurement)
 BACKGROUND	0840	Direct Static Background Measurement	1.5 Minute	B15564 (#109) 06/30/00	4.76	start of shift
 BACKGROUND	0842	Direct Static Background Measurement	1.5 Minute		4.46	
 BACKGROUND	0844	Direct Static Background Measurement	1.5 Minute		4.41	
 BACKGROUND	0948	Direct Static Background Measurement	1.5 Minute		4.73	END OF shift
 BACKGROUND	0950	Direct Static Background Measurement	1.5 Minute		4.98	
 BACKGROUND	0954	Direct Static Background Measurement	1.5 Minute		7.56	
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			

Form IVP-1001, July 1999

Supervisory Review: A. Samirban Signature: A. Samirban Date: 02/03/00 File Index Number: _____

Survey Location: RFETS, 779 Cluster / Building 727-02 Date: 01-25-00

Survey Unit: 727-02

Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03-23-00

Detector Probe Type: Eberline, HP-100 Operator Name: A. Samir Signature: [Signature]

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (dpm/100 cm ²)	Comments (Include reason for background measurement)
BACKGROUND	0904	Direct Static Background Measurement	1.5 Minute	S15624 (#109) 06/30/00	15.1	Start of survey
BACKGROUND	0906	Direct Static Background Measurement	1.5 Minute		8.5	
BACKGROUND	0908	Direct Static Background Measurement	1.5 Minute		18.7	
BACKGROUND	1022	Direct Static Background Measurement	1.5 Minute		14.9	1 hr check
BACKGROUND	1024	Direct Static Background Measurement	1.5 Minute		15.6	
BACKGROUND	1026	Direct Static Background Measurement	1.5 Minute		22.5	
BACKGROUND	1144	Direct Static Background Measurement	1.5 Minute		12.3	End of survey








Form IVP-1001, July 1999

Supervisory Review: _____ Signature _____ Date _____

File Index Number _____

INDEPENDENT VERIFICATION INSTRUMENT BACKGROUND DATA SHEET

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
Instrument Model Number: Eberline, E 600 Instrument ID Number: D15622 (#321) Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Operator Name: A. Samir Signature: [Signature]








Sample ID No. (Affix for Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (dpm/100 cm ²)	Comments (Include reason for background measurement)
 BACKGROUND	1146	Direct Static Background Measurement	1.5 Minute	D15564 (#109) 06/30/00	10.3	End of survey
 BACKGROUND	1148	Direct Static Background Measurement	1.5 Minute	↓	15.1	↓
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			

Form IVP-1001, July 1999

Supervisory Review: _____ Signature _____ Date _____ File Index Number _____

INDEPENDENT VERIFICATION INSTRUMENT BACKGROUND DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 500 Instrument ID Number: 515622 (#321) Calibration Expires: 03/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Anticounterfeit Background Bar Code)	Time	Measurement Type	Static Count Rate (min/60)	HP-100 Probe ID	GROSS Instrument Reading (dpm/100 cm)	Comments (Include reason for background measurement)
 BACKGROUND	1034	Direct Static Background Measurement	1.5 Minute	815564 #109 06/30/00	1.3	START OF shift
 BACKGROUND	1036	Direct Static Background Measurement	1.5 Minute		1.1	
 BACKGROUND	1037	Direct Static Background Measurement	1.5 Minute		4.8	
 BACKGROUND	1143	Direct Static Background Measurement	1.5 Minute		4.8	END OF shift
 BACKGROUND	1145	Direct Static Background Measurement	1.5 Minute		4.7	
 BACKGROUND	1146	Direct Static Background Measurement	1.5 Minute		4.6	
 BACKGROUND	1240	Direct Static Background Measurement	1.5 Minute		1.2	start of shift

Form IVP-1001, July 1999








Supervisory Review: A. Samikhan Signature: [Signature] Date: 02/03/00
 Print Name: A. Samikhan File Index Number: _____

INDEPENDENT VERIFICATION INSTRUMENT BACKGROUND DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00

Instrument Model Number: Eberline, E 500 Instrument ID Number: 515622 (#321) Calibration Expires: 03/23/00

Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron








Sample ID No. (Anticounterfeit Background Bar Code)	Time	Measurement Type	Static Count Time (Minutes)	HP (00) Display ID	GROSS Instrument Reading (cpm/00 cpm)	Comments (Inclusion for background measurement)
 BACKGROUND	1242	Direct Static Background Measurement	1.5 Minute	S15564 #109 06/30/00	14.66	S-O-S (cont.) 2/3
 BACKGROUND	1244	Direct Static Background Measurement	1.5 Minute		7.9	↓
 BACKGROUND	1358	Direct Static Background Measurement	1.5 Minute		15.8	END OF SHIFT
 BACKGROUND	1400	Direct Static Background Measurement	1.5 Minute		12.3	↓
 BACKGROUND	1402	Direct Static Background Measurement	1.5 Minute	↓	15.7	↓
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			

Form IVP-1001, July 1999

Supervisory Review: A. Samikhan Signature: [Signature] Date: 02/03/00 File Index Number: _____

Print Name: _____








Survey Location: RFETS, 779 Cluster / Building Survey Unit: 782-02 Date: 02-02-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 815622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (cpm/100 cpm)	Comments (Include reason for background measurement)
 BACKGROUND	0925	Direct Static Background Measurement	1.5 Minute	815624 #109 06/30/00	4.6	START OF SURVEY
 BACKGROUND	0929	Direct Static Background Measurement	1.5 Minute		14.7	
 BACKGROUND	0931	Direct Static Background Measurement	1.5 Minute		7.95	
 BACKGROUND	1040	Direct Static Background Measurement	1.5 Minute		8.42	1 hr check
 BACKGROUND	1042	Direct Static Background Measurement	1.5 Minute		22.1	
 BACKGROUND	1044	Direct Static Background Measurement	1.5 Minute		22.1	
 BACKGROUND	1137	Direct Static Background Measurement	1.5 Minute		14.34	END OF shift

Form IVP-1001, July 1999
 Supervisory Review: A. Samir Signature: A. Samir Date: 02/02/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION INSTRUMENT BACKGROUND DATA SHEET

Survey Location: RFEIS 779 Cluster / Building Survey Unit: 782-02 Date: 02-02-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 815622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMPBELL Signature: Jay Campbell

Sample ID No. (Alixor Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID #	GROSS Instrument Reading (dpm/100 cm ²)	Comments (Include reason for background measurement)
 BACKGROUND	1139	Direct Static Background Measurement	1.5 Minute	815564	7.66	END OF Shift
 BACKGROUND	1140	Direct Static Background Measurement	1.5 Minute	#109 04/30/00	28.0	↓
 BACKGROUND	1317	Direct Static Background Measurement	1.5 Minute		7.87	START OF Shift
 BACKGROUND	1319	Direct Static Background Measurement	1.5 Minute		8.13	
 BACKGROUND	1320	Direct Static Background Measurement	1.5 Minute		4.6	↓
 BACKGROUND	1458	Direct Static Background Measurement	1.5 Minute		11.54	END OF Shift
 BACKGROUND	1500	Direct Static Background Measurement	1.5 Minute	↓	8.31	↓

Form IVP-1001, July 1999

Supervisory Review: A. Samaha Signature: A. Samaha Date: 02/02/00 File Index Number: _____
 Print Name

Survey Location: RFEIS, 779 Cluster / Building

Survey Unit: 782-02

Date: 02-02-00

Instrument Model Number: Eberline, E 500








Instrument ID Number: S15622 (#321)

Calibration Expires: 03-23-00

Detector Probe Type: Eberline, HP-100

Operator Name: JAY CAMERON

Signature: *Jay Cameron*

Sample ID No. (Attach Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID #	GROSS Instrument Reading (cpm/100 cm)	Comments (Include reason for background measurement)
 BACKGROUND	1502	Direct Static Background Measurement	1.5 Minute	1515561 #109 06/30/00	4.94	END OF shift
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			
 BACKGROUND		Direct Static Background Measurement	1.5 Minute			

Form IVP-1001, July 1999

Supervisory Review: A. Sambrano

Print Name

A. Sambrano








Signed

102/02/00

Date

File Index Number

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-01 Date: 02-02-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

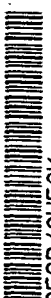






Sample ID No. (AUX or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (cpm/400 cm ²)	Accept YES NO	Comments (Include reason for response check measurement)
 RESP/CHECK	1534	Direct Static Measurement Response Check	1.5 Minute	515364 #109 06/30/00	1577	✓	57427 OF SHIFT
 RESP/CHECK	1535	Direct Static Measurement Response Check	1.5 Minute		1577	✓	
 RESP/CHECK	1537	Direct Static Measurement Response Check	1.5 Minute		1564	✓	
 RESP/CHECK	1654 1632 212	Direct Static Measurement Response Check	1.5 Minute		161406 212		end of shift
 RESP/CHECK	1656	Direct Static Measurement Response Check	1.5 Minute		1570		
 RESP/CHECK	1658	Direct Static Measurement Response Check	1.5 Minute		1423		
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				

Form IVP-1002, July 1999

Supervisory Review: A. Samir Signature: A. Samir Date: 2/2/00
 File Index Number: _____


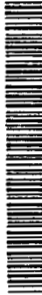

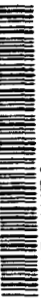

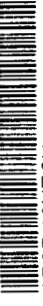

INDEPENDENT VERIFICATION INSTRUMENT RESPONSE CHECK DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-01 Date: 04/03/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: Jay Cameron Signature: Jay Cameron

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Counting Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (cpm/100 cm ²)	Accept YES NO	Comments (Include reason for response or check measurement)
 RESP/CHECK	0850	Direct Static Measurement Response Check	1.5 Minute	515564 (#109) 06/30/00	1448	✓	start of shift
 RESP/CHECK	0852	Direct Static Measurement Response Check	1.5 Minute		1533	✓	
 RESP/CHECK	0854	Direct Static Measurement Response Check	1.5 Minute		1687	✓	
 RESP/CHECK	1000	Direct Static Measurement Response Check	1.5 Minute		1495	✓	END OF shift
 RESP/CHECK	1002	Direct Static Measurement Response Check	1.5 Minute		1440	✓	
 RESP/CHECK	0804	Direct Static Measurement Response Check	1.5 Minute		1472	✓	
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				








Form IVP-1002, July 1999
 Supervisory Review: A Samblon Signature: A Samblon Date: 03/03/00 File Index Number: _____
 Print Name: _____

Survey Location: RFETS, 779 Cluster / Building
Instrument Model Number: Eberline, E 600
Detector Probe Type: Eberline, HP-100
Survey Unit: 121-002
Instrument ID Number: S15622 (#321)
Operator Name: A. Sauter
Date: 6-1-00
Calibration Expires: 03-23-00
Signature: [Signature]

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (dpm/100 cm²)	Accept		Comments (Include reason for response check if measurement)
						YES	NO	
 RESP/CHECK	0857	Direct Static Measurement Response Check	1.5 Minute	815564 #109 06/30/00	1451	<input checked="" type="checkbox"/>	<input type="checkbox"/>	START OF SURVEY
 RESP/CHECK	0859	Direct Static Measurement Response Check	1.5 Minute		1451	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 RESP/CHECK	0901	Direct Static Measurement Response Check	1.5 Minute		1496	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 RESP/CHECK	1016	Direct Static Measurement Response Check	1.5 Minute		1610	<input checked="" type="checkbox"/>	<input type="checkbox"/>	1 hr check
 RESP/CHECK	1018	Direct Static Measurement Response Check	1.5 Minute		1520	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 RESP/CHECK	1020	Direct Static Measurement Response Check	1.5 Minute		1570	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
 RESP/CHECK	1138	Direct Static Measurement Response Check	1.5 Minute		1530	<input checked="" type="checkbox"/>	<input type="checkbox"/>	END OF Shift








INDEPENDENT VERIFICATION INSTRUMENT RESPONSE CHECK DATA SHEET

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Operator Name: A. Samkin Signature: [Signature]

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (dpm/100 cm ²)	Accept YES NO	Comments (Include reason for response check measurement)
 RESP/CHECK	1140	Direct Static Measurement Response Check	1.5 Minute	815564 (#109) 06/30/00	1500	✓	END OF Shift
 RESP/CHECK	1142	Direct Static Measurement Response Check	1.5 Minute	✓	1440	✓	↓
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute	✓			
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				

INDEPENDENT VERIFICATION INSTRUMENT RESPONSE CHECK DATA SHEET

Survey Location: RFEIS, 779 Cluster / Building _____ Date: 782-01 02/03/00
Survey Unit: _____ Calibration Expires: 03/23/00
Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321)
Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron








Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe (ID)	GROSS Instrument Reading (cpm/100 cm)	Accept		Comments (Include reason for response check in measurement)
						Y	N	
 RESP/CHECK	1039	Direct Static Measurement Response Check	1.5 Minute	S15564 #109 02/30/00	1571	✓		START OF Shift
 RESP/CHECK	1041	Direct Static Measurement Response Check	1.5 Minute		1557	✓		
 RESP/CHECK	1042	Direct Static Measurement Response Check	1.5 Minute		1547	✓		
 RESP/CHECK	1147	Direct Static Measurement Response Check	1.5 Minute		1393	✓		END OF Shift
 RESP/CHECK	1149	Direct Static Measurement Response Check	1.5 Minute		1528	✓		
 RESP/CHECK	1150	Direct Static Measurement Response Check	1.5 Minute		1491	✓		
 RESP/CHECK	1246	Direct Static Measurement Response Check	1.5 Minute		1567	✓		START OF Shift

INDEPENDENT VERIFICATION INSTRUMENT RESPONSE CHECK DATA SHEET

Survey Location: RFEIS, 779 Cluster / Building Survey Unit: 02/03/00 Date: 02/03/00

Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03/23/00

Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron








Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID#	GROSS Instrument Reading (cpm/100cm)	Accept YES NO	Comments (Include reason for response check measurement)
 RESP/CHECK	1248	Direct Static Measurement Response Check	1.5 Minute	515564 #109 06/30/00	1516	✓	START OF Shift
 RESP/CHECK	1250	Direct Static Measurement Response Check	1.5 Minute		1666	✓	
 RESP/CHECK	1352	Direct Static Measurement Response Check	1.5 Minute		1438	✓	END OF Shift
 RESP/CHECK	1354	Direct Static Measurement Response Check	1.5 Minute		1455	✓	
 RESP/CHECK	1356	Direct Static Measurement Response Check	1.5 Minute		1445	✓	
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				

Form IVP-1002, July 1999

Supervisory Review: A. Samalita Signature: [Signature] Date: 02/03/00 File Index Number: _____

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Survey Location: RFEIS, 779 Cluster / Building 782-02 Date: 02-02-00
Survey Unit: 782-02
Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID #	GROSS Instrument Reading (dpm/100 cm ²)	Accept Y N E S F O	Comments (Include reason for response check measurement)
 RESP/CHECK	0919	Direct Static Measurement Response Check	1.5 Minute	515564 #109 06/30/00	1502	✓	START OF SURVEY
 RESP/CHECK	0921	Direct Static Measurement Response Check	1.5 Minute		1591	✓	
 RESP/CHECK	0923	Direct Static Measurement Response Check	1.5 Minute		1451	✓	
 RESP/CHECK	1032	Direct Static Measurement Response Check	1.5 Minute		1413	✓	1 hr check
 RESP/CHECK	1034	Direct Static Measurement Response Check	1.5 Minute		1443	✓	
 RESP/CHECK	1035	Direct Static Measurement Response Check	1.5 Minute		1359	✓	
 RESP/CHECK	1133	Direct Static Measurement Response Check	1.5 Minute		1499	✓	END OF Shift

Form IVP-1002, July 1999

Supervisory Review: A. Samir Date: 02/02/00
Signature: A. Samir

File Index Number








Print Name

Signature

Date

INDEPENDENT VERIFICATION INSTRUMENT RESPONSE CHECK DATA SHEET



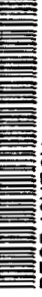
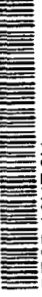



Survey Location: RFETS, 779 Cluster / Building Date: 02-02-00
Survey Unit: 787-02
Instrument Model Number: Eberline, E 600 Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Instrument ID Number: 515622 (#321) Signature: Jay Cameron
Operator Name: JAY CAMERON

Sample ID No. (Affix Record Background Bar Code)	Time	Measurement Type	Static Count Time (minutes)	HP-100 Probe ID?	GROSS Instrument Reading (dpm/100cm ²)	Accept		Comments (Include reason for response check measurement)
						Y	N	
 RESP/CHECK	1135	Direct Static Measurement Response Check	1.5 Minute	515564 #109 06/30/00	1502	✓		End of Shift
 RESP/CHECK	1137	Direct Static Measurement Response Check	1.5 Minute		1549	✓		↓
 RESP/CHECK	1322	Direct Static Measurement Response Check	1.5 Minute		1547	✓		START OF Shift
 RESP/CHECK	1324	Direct Static Measurement Response Check	1.5 Minute		15676 1634	✓		
 RESP/CHECK	1326	Direct Static Measurement Response Check	1.5 Minute		1506	✓		↓
 RESP/CHECK	1501	Direct Static Measurement Response Check	1.5 Minute		1403	✓		END OF Shift
 RESP/CHECK	1506	Direct Static Measurement Response Check	1.5 Minute		1348	✓		↓

Form IVP-1002, July 1999

Supervisory Review: A. Samir Signature: A. Samir Date: 02/02/00
File Index Number: _____







Survey Location: RFETS, 779 Cluster/Building Survey Unit: 782-02 Date: 02-02-00
Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Operator Name: JAY CAMERON Signature: Jay Cameron

Sample ID No. (Affix or Record Background Bar Code)	Time	Measurement Type	Static Counting Time (minutes)	HP-100 Probe ID	GROSS Instrument Reading (dpm/100 cm ²)	Accept YES NO	Comments (Include reason for response or check measurement)
 RESP/CHECK	1508	Direct Static Measurement Response Check	1.5 Minute	S15564 (#109) 06/30/00	1410		END OF SHIFT
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				
 RESP/CHECK		Direct Static Measurement Response Check	1.5 Minute				

Form IVP-1002, July 1999
Supervisory Review: A. Sam Khan Signature: A. Sam Khan Date: 02/02/00 File Index Number: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET







Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samikam Signature: Jay Cameron

Sample Location (to Sample, use a 10' x 10' grid (Eberline))	Time	Sample Measurement (Type)	Brigade/Operator ID Number	Static Count (Type)	Gravel Retaining (Eberline)	Comments (Indicate completion of survey, start of test, and method used, if applicable)
 VP0000381	0858	Direct Static Measurement	515564 #109 06/30/00	1.5 Minute	8.93	Pre media Survey initial
 VP0000382	0902	Direct Static Measurement		1.5 Minute	2.04	
 VP0000383	0906	Direct Static Measurement		1.5 Minute	5.45	
 VP0000384	0911	Direct Static Measurement		1.5 Minute	5.05	
 VP0000385	0913	Direct Static Measurement		1.5 Minute	1.8	
 VP0000386	0915	Direct Static Measurement		1.5 Minute	11.36	concrete
<u>Duplicate 386</u>	0918	Direct Static Measurement		1.5 Minute	7.4	concrete ↓

Form IVP-1000, July 1999
 Supervisory Review: A. Samikam Signature: A. Samikam Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 721-01 Date: 02/03/00
 Instrument Model Number: Eberline, E-600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. SAMPSON Signature: JAY CAMERON

Sample Location (Include Sample ID, Date, and Time)	Time	Sample Measurement	HP-100 Probe ID Number	Static Count (Min)	GROSS MEASUREMENT (Gross/100 cm)	Comments (Include all applicable materials and methods used)
 VP0000387	0919	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	20.8	Pre Media Survey on concrete
 VP0000388	0923	Direct Static Measurement		1.5 Minute	2.02	metal
 VP0000389	0926	Direct Static Measurement		1.5 Minute	1.8	metal
 VP0000390	0930	Direct Static Measurement		1.5 Minute	17.7	concrete
 VP0000391	0933	Direct Static Measurement		1.5 Minute	1.9	metal
 VP0000392	0935	Direct Static Measurement		1.5 Minute	8.94	metal
<u>Duplicate 392</u>	0937	Direct Static Measurement		1.5 Minute	8.97	metal

Form IVP-1000, July 1999
 Supervisory Review: A. SAMPSON Signature: J. SAMPSON Date: 02/03/00 File Index Number: _____
 Print Name: _____

02/03/00

Date:

Survey Unit: 727-01

Calibration Expires: 03-23-00

Survey Unit: 121-01
Instrument ID Number: 515622 (#321)




Operator Name: A. Samuelson
JAY CAMERON

Signature: 

name 779 Cluster / Building

Instrument Model Number: Eberline, E 600

Detector Probe Type: Eberline HP-100

Detector Probe Type	Sample Location (USDA coordinates)	Time	Sampling Method	Sample ID Number	Static Count (1.5 Minute)	Gross Beta Rate (dpm/100 cm)	Comments (Include detection method, location, date, time)
	 1VP0000393	0939	Direct Static Measurement	5415564 #109 06/30/00	1.5 Minute	8.9	Per Median Survey Metal
	 1VP0000394	0941	Direct Static Measurement		1.5 Minute	2.0	
	 1VP0000395	0943	Direct Static Measurement		1.5 Minute	1.9	
			Direct Static Measurement		1.5 Minute		
			Direct Static Measurement		1.5 Minute		
			Direct Static Measurement		1.5 Minute		
			Direct Static Measurement		1.5 Minute		

File Index Number -

1,02/03/00

A. Amalg

Sampiran

Form IVP-1000, July 1999







Signature.

Print Name _____

Date _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET







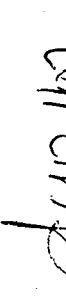
Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-01 (Bldg. 727) Date: 2/2/00
 Instrument Model Number: Eberline, E 500 Instrument ID Number: S15622 (#321) Calibration Expires: 3/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: Jay Cameron

Sample Location (or Sample ID) (Vinson or Eberline Code)	Time	Sample or Measurement Type	HP-100 Probe ID Number	Static Count Time	Gross Indication (cpm/400-sec)	Comments (Include description of surface characteristics and material composition, if applicable)
 VP0000396	1550	Direct Static Measurement	D15564 (#109) OK/30/100	1.5 Minute	14.37	pre media sampling material on block
 VP0000397	1554	Direct Static Measurement		1.5 Minute	11.12	concrete
 VP0000398	1558	Direct Static Measurement		1.5 Minute	4.48	supported block
 VP0000399	1602	Direct Static Measurement		1.5 Minute	24.7	supported
 VP0000400	1608	Direct Static Measurement		1.5 Minute	3.69	concrete
 VP0000401	1612	Direct Static Measurement		1.5 Minute	7.31	concrete
dep 401	1614	Direct Static Measurement		1.5 Minute	7.20	concrete

Form IVP-1000, July 1999
 Supervisory Review: A. Sambran Signature: A. Sambran Date: 02/02/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET



Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-01 (Bldg. 727) Date: 2/2/00
Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 3/23/00
Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: Jay Cameron

Sample Location: or Sample ID (Also record Bar Code #)	Time	Sampler or Measurement Type	HP-100 Probe ID Number	Static Count Time	Gross Indentment Reading (Gm/100 cm)	Comments (Include description of surface characteristics and media composition, if applicable)
 IVP0000402	1618	Direct Static Measurement	S15564 (#109) 06/30/00	1.5 Minute	7.49	pre media sampling
 IVP0000403	1622	Direct Static Measurement		1.5 Minute	31.4	crusher block
 IVP0000404	1626	Direct Static Measurement		1.5 Minute	10.67	concrete
 IVP0000405	1630	Direct Static Measurement		1.5 Minute	14.6	crusher block
 IVP0000406	1634	Direct Static Measurement		1.5 Minute	14.55	crusher block
 IVP0000407	1638	Direct Static Measurement		1.5 Minute	4.31	crusher block
 IVP0000408	1640	Direct Static Measurement		1.5 Minute	4.38	crusher block

Form IVP-1000, July 1999
Supervisory Review: A. Sam Khan Signature: A. Sam Khan Date: 02/02/00 File Index Number: _____
Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 727-C1 (66kg, 727) Date: 2/02/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 Calibration Expires: 3/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: J. Cameron

Sample Location # or Sample ID (Link or record Bar Code)	Time	Sampling Measurement Type	HP-100 Probe ID Number	Static Count Time	Gross Instrument Reading (gpm/100 gpm)	Comments (Include description of surface characteristics and media composition, if applicable)
 IVP0000408	<u>16:44</u> <u>16:44</u> <u>16:44</u>	Direct Static Measurement	<u>S15564</u> <u>(#109)</u> <u>06/30/00</u>	1.5 Minute	<u>17.62</u>	<u>pre concrete</u>
 IVP0000409	<u>16:48</u>	Direct Static Measurement		1.5 Minute	<u>4.09</u>	<u>↓ concrete</u>
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

Form IVP-1000, July 1999
 Supervisory Review: A. Sami / Jan Signature: A. Sami Date: 02/02/00 File Index Number: _____
 Print Name







INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samulow Signature: [Signature]

Sample Location: (or Sample ID, or Reference Code)	Time	Sample or Measurement Type	HP-100 Probe ID Number	Static Equil. Time	Gross Reading (GRV409/cm)	Comment: (Include description of surface characteristics and media composition, as applicable)
 IVP0000351	1000	Direct Static Measurement	515564 (#109) 06/30/00	1.5 Minute	12.3	Pre Media Sampling metal
 IVP0000352	1002	Direct Static Measurement		1.5 Minute	8.8	
 IVP0000353	1004	Direct Static Measurement		1.5 Minute	21.5 2.9 mv	
 IVP0000354	1006	Direct Static Measurement		1.5 Minute	20.1	
 IVP0000355	1008	Direct Static Measurement		1.5 Minute	15.7	
 IVP0000356	1010	Direct Static Measurement		1.5 Minute	15.8	
<u>Duplicate 356</u>	1012	Direct Static Measurement		1.5 Minute	18.7	

INDEPENDENT VERIFICATION SURVEY DATA SHEET







Survey Location: REETS 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515672 (#331) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samulian Signature: [Signature]

Sample Location (or Sample File #) (if using Gold Bar Code)	Time	Sample Method (Type)	HP-100 Probe ID Number	Static Count Time	Gross Measurement (dpm/100cc)	Comment (Indicate Sample Location, Date, and Media Composition, if applicable)
 IVP0000357	1028	Direct Static Measurement	515564 (#109) 06/30/00	1.5 Minute	21.9	Pre Media Sampling metal
 IVP0000358	1030	Direct Static Measurement		1.5 Minute	20.5	
 IVP0000359	1032	Direct Static Measurement		1.5 Minute	21.1	
 IVP0000360	1034	Direct Static Measurement		1.5 Minute	20.6	
 IVP0000361	1036	Direct Static Measurement		1.5 Minute	12.4	
 IVP0000362	1038	Direct Static Measurement		1.5 Minute	22.0	
<u>Duplicate 362</u>	1040	Direct Static Measurement	↓	1.5 Minute	22.7	↓

Form IVP-1000, July 1999
 Supervisory Review: _____ Signature: _____ Date: _____
 File Index Number: _____
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INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samalaw Signature: [Signature]







Sample Location (or Sample ID) (Reference to Job or Log Code)	Time	Sample Measurement (Type)	HP-100 Probe ID Number	Static Count Time	Gross Instrument Reading (cpm/w/90cm)	Comments (Include all problems or unusual conditions observed in the location, or in the probe)
 IVP0000363	1042	Direct Static Measurement	S15564 (#109) 06/30/00	1.5 Minute	19.4	Pre Media Sampling metal
 IVP0000364	1044	Direct Static Measurement		1.5 Minute	13.4	
 IVP0000365	1046	Direct Static Measurement		1.5 Minute	29.9	
 IVP0000366	1048	Direct Static Measurement		1.5 Minute	19.1	
 IVP0000367	1052	Direct Static Measurement		1.5 Minute	22.0	cinder block
 IVP0000368	1054	Direct Static Measurement		1.5 Minute	15.4	
Duplicate 368	1056	Direct Static Measurement		1.5 Minute	14.0	

Form IVP-1000, July 1999

Supervisory Review: _____ Signature _____ Date _____
 File Index Number _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REIS, 779 Cluster/Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samal Signature: [Signature]

Sample Location (to Sample, use a 100mm x 100mm x 100mm)	Time	Sampling Method (WFO)	HP-100 Probe ID Number	Static Count (1.5 Minute)	Gross Instrument Reading (gpm/100cm)	Comments (Indicate if sample is not representative of the media composition to be applied)
 IVP0000369	0917	Direct Static Measurement	S15564 (#109) 06/30/00	1.5 Minute	24.9	Pre Media Sampling asphalt
 IVP0000370	1104	Direct Static Measurement		1.5 Minute	18.9	under block
 IVP0000371	1108	Direct Static Measurement		1.5 Minute	36.3 16.3 gr	
 IVP0000372	1112	Direct Static Measurement		1.5 Minute	29.4	
 IVP0000373	0922	Direct Static Measurement		1.5 Minute	24.7	asphalt
 IVP0000374	1114	Direct Static Measurement		1.5 Minute	15.8	under block
Duplicate 374	1118	Direct Static Measurement		1.5 Minute	15.8	

Form IVP-1000, July 1999

Supervisory Review: _____

Print Name






Signature

Date

File Index Number







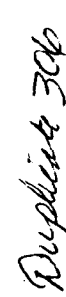
INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samalmar Signature: [Signature]

Sample Location (or Sample File Reference Code)	Time	Sample Measurement Type	BP-100 Probe ID Number	Static Equil. Time	Gross Indentment Reading (0.001" = 0.001")	Comments (Include description of surface, hardness, and media composition, if applicable)
 IVP00000375	1124	Direct Static Measurement	515564 (#109) 06/30/00	1.5 Minute	15.8	Pre Media Sampling
 IVP00000376	0927	Direct Static Measurement		1.5 Minute	24.8	asphalt
 IVP00000377	1128	Direct Static Measurement		1.5 Minute	8.8	asphalt
 IVP00000378	1130	Direct Static Measurement		1.5 Minute	19.1	
 IVP00000379	1134	Direct Static Measurement		1.5 Minute	19.4	
Duplicate 379	1136	Direct Static Measurement		1.5 Minute	19.6	
		Direct Static Measurement		1.5 Minute	17.3	

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samirban Signature: Jay Cameron








Sample Location (Vibration Code)	Time	Sampling Method	HP-100 Probe ID Number	Static Count Time	Gross Interference (dBm/90sec)	Comments (Include Calibration, Frequency, Date, etc.)
 IVP0000301	1054	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	34.4 mV 28.5	Free Media Sampling painted concrete HP
 IVP0000302	1058	Direct Static Measurement		1.5 Minute	31.1	
 IVP0000303	1102	Direct Static Measurement		1.5 Minute	13.79	
 IVP0000304	1106	Direct Static Measurement		1.5 Minute	24.1	
 IVP0000305	1109	Direct Static Measurement		1.5 Minute	17.5	
 IVP0000306	1113	Direct Static Measurement		1.5 Minute	13.9	
 IVP0000307	1115	Direct Static Measurement		1.5 Minute	10.6	

Duplicate 306

Form IVP-1000, July 1999
 Supervisory Review: A. Samirban Signature: A. Samirban Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samirban Signature: Jay Cameron

Sample Location (Include Date, Time, Location, and Depth)	Time	Sampling Method (e.g., Direct Static)	HP Model/Serial Number	Static Count (min)	Gross In-Place Density (g/cm ³)	Comments (Include Application, Direction, and Date of Test)
 IVP0000307	1119	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	24.2	Pre Median Sampling painted concrete
 IVP0000308	1122	Direct Static Measurement		1.5 Minute	24.1	
 IVP0000309	1126	Direct Static Measurement		1.5 Minute	14.1	
 IVP0000310	1130	Direct Static Measurement		1.5 Minute	27.4	
 IVP0000311	1134	Direct Static Measurement		1.5 Minute	10.9	
 IVP0000312	1138	Direct Static Measurement		1.5 Minute	11.1	
 IVP0000312	1140	Direct Static Measurement		1.5 Minute	10.8	

Replicate 312

Form IVP-1000, July 1999
 Supervisory Review: A. Samirban Signature: J. Samir Date: 02/03/00 File Index Number: 192

INDEPENDENT VERIFICATION SURVEY DATA SHEET







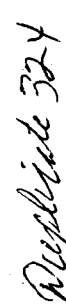
Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samirban Signature: Jay Cameron

Time	Sampled Measurement Type	HP 400 Probe (Dist. in ft.)	Static Load (lb)	Static Load (lb) (lb/ft²)	Comments (Indicate any conditions or equipment used)
1254	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	7.1	Per Media Amplifiers Painted Concrete
1258	Direct Static Measurement		1.5 Minute	10.8	
1302	Direct Static Measurement		1.5 Minute	17.5	
1304	Direct Static Measurement		1.5 Minute	10.9	
1314	Direct Static Measurement		1.5 Minute	3.7	concrete
1316	Direct Static Measurement		1.5 Minute	1.1	
1317	Direct Static Measurement	5 ↓	1.5 Minute	1.2	

Form IVP-1000, July 1999
 Supervisory Review: A. Samirban Signature: A. Samirban Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samir / JAY CAMERON Signature: Jay Cameron






Sample Location (Reference to Building)	Time	Sampling Method (Type)	HP-100 Probe ID Number	Static Charge (VDC)	Direct Static Reading (pH/w/90cm)	Comments (Indicate if applicable for direct static reading method, composition, etc. apply (1999))
 IVP0000319	1319	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	1.3	Pre Medicine Sampling Concrete
 IVP0000320	1321	Direct Static Measurement		1.5 Minute	8.0	
 IVP0000321	1323	Direct Static Measurement		1.5 Minute	4.7	
 IVP0000322	1324	Direct Static Measurement		1.5 Minute	10.98	
 IVP0000323	1326	Direct Static Measurement		1.5 Minute	11.5	
 IVP0000324	1328	Direct Static Measurement		1.5 Minute	7.7	
 IVP0000325	1329	Direct Static Measurement		1.5 Minute	7.9	

Duplicate 324
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Form IVP-1000, July 1999
 Supervisory Review: A. Samir Signature: A. Samir Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515672 (#331) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samirhan Signature: Guy Cameron







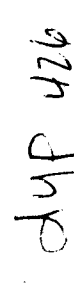
Sample Location: Eberline, E 600 (VIA GPS OR SURVEYOR'S RECORD)	Time	Sampling Method (VIA)	HP-100 Probe ID Number	Static Load (lb)	Gross Settlement (inches) (0.001 in = 0.0254 cm)	Comments (Indicate if settlement is due to test or to actual ground movement or both, if applicable)
 IVP0000325	1333	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	4.7	Pre Media Sampling concrete
 IVP0000326	1338	Direct Static Measurement		1.5 Minute	18.30	
 IVP0000327	1337	Direct Static Measurement		1.5 Minute	14.9	
 IVP0000328	1339	Direct Static Measurement		1.5 Minute	8.2	
 IVP0000329	1342	Direct Static Measurement		1.5 Minute	1.3	
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

Form IVP-1000, July 1999

Supervisory Review: A. Samirhan Signature: A. Samirhan Date: 02/03/00 File Index Number: _____
 Print Name: _____







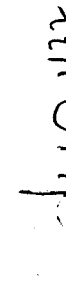
INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-02 Date: 2/02/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samalman Signature: A. Samalman

Stamp Location: (Instrument ID, Date, Time)	Time	Sampling Method	HP-100 Probe ID Number	Static Equip. Temp.	Gross Indentation: (lb./in.) (GPM/0.09 in.)	Comments: (Indicate if sampling or if covered by surface, and if not, indicate if from the surface)
 IVP0000421	0939	Direct Static Measurement	S15564 (#109) 06/30/00	1.5 Minute	10.4	PRE MEDIA SAMPLING painted concrete
 IVP0000422	0943	Direct Static Measurement		1.5 Minute	24.1	
 IVP0000423	0947	Direct Static Measurement		1.5 Minute	20.6	
 IVP0000424	0952	Direct Static Measurement		1.5 Minute	6.9	
 IVP0000425	0958	Direct Static Measurement		1.5 Minute	17.52	concrete
 IVP0000426	1000	Direct Static Measurement		1.5 Minute	14.01	painted concrete
 IVP0000427	1005	Direct Static Measurement		1.5 Minute	14.02 17.33 5.2	painted concrete

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 779 Cluster / Building Survey Unit: 782-02 Date: 2/02/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Saml/BW Signature: [Signature]







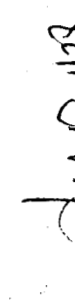
Sample Location (or Sample ID)	Time	Sampling Method	HP 100 Probe (ID Number)	Static Count (1.5 Minute)	Gross Reading (cpm/0.95cm)	Comments (Include description of structure and material composition, if applicable)
 IVP0000427	1010	Direct Static Measurement	515564 (#109) 06/30/00	1.5 Minute	3.96	pre media sampling painted concrete
 IVP0000428	1016	Direct Static Measurement		1.5 Minute	7.25	concrete
 IVP0000429	1018	Direct Static Measurement		1.5 Minute	7.14	concrete
 IVP0000430	1020	Direct Static Measurement		1.5 Minute	7.22	painted concrete
 IVP0000431	1025	Direct Static Measurement		1.5 Minute	11.05	painted concrete
 IVP0000432	1029	Direct Static Measurement		1.5 Minute	11.20	✓ concrete
 IVP0000433	1031	Direct Static Measurement	✓	1.5 Minute	7.69	concrete

Form IVP-1000, July 1999

Supervisory Review: _____ Signature: _____ Date: _____
 File Index Number: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET







Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-02 Date: 2/2/00
Instrument Model Number: Eberline, E-600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
Detector Probe Type: Eberline, HP-100 Operator Name: A. Samilman Signature: [Signature]

Sample Location (Address, Lot, Section, Township, Range, and Initials)	Time	Sampling Method (HP-100)	HP-100 Probe (ID Number)	Static Count (min)	GROSS Inducement (10.15 min) (Gross/100-sec)	Comments (Indicate if sampling or recording is in a metal reinforcement, etc. (BAC-100))
 VP0000433	1050	Direct Static Measurement	515564 (#109) 06/30/00	1.5 Minute	1.1	pre media sampling concrete
 VP0000434	1054	Direct Static Measurement		1.5 Minute	7.71	painted concrete
 VP0000435	1058	Direct Static Measurement		1.5 Minute	21.4	painted concrete
 VP0000436	1115	Direct Static Measurement		1.5 Minute	18.33	painted concrete
 VP0000437	1120	Direct Static Measurement		1.5 Minute	14.96	
 VP0000438	1124	Direct Static Measurement		1.5 Minute	18.27	
 VP0000438	1126	Direct Static Measurement		1.5 Minute	18.44	

Form IVP-1000, July 1999
Supervisory Review: A. Samilman Signature: [Signature] Date: 02/02/00 File Index Number: _____
Print Name






INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Date: 2/2/00
 Survey Unit: _____ Calibration Expires: 3/23/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321)
 Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: J. Cameron

Sample Location (or Sample ID) (Alix or record Bar Code)	Time	Sample Measurement Type	HP-100 Probe ID Number	Static Equil. Time	GROSS Measurement (2.0 Gallon (630V/100 cm)	Comments (Included description of surface direct test site and media composition, if applicable)
 IVP0000439	1130	Direct Static Measurement	5' 15564 (#109) 06/30/00	1.5 Minute	11.96	PRE MEDIA SAMPLING concrete
 IVP0000440	1340	Direct Static Measurement		1.5 Minute	10.48	parted concrete
 IVP0000441	1344	Direct Static Measurement		1.5 Minute	3.55	
 IVP0000442	1355	Direct Static Measurement		1.5 Minute	3.43	
 IVP0000443	1402	Direct Static Measurement		1.5 Minute	17.40	
 IVP0000444	1408	Direct Static Measurement		1.5 Minute	20.7	
Duplicate 444	1410	Direct Static Measurement		1.5 Minute	17.35	

Form IVP-1000, July 1999
 Supervisory Review: A. Samalitan Signature: [Signature] Date: 02/02/00
 File Index Number: _____

Survey Location: REETS 779 Cluster / Building Survey Unit: 782-02 Date: 02/02/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03/23/00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samlitz Signature: [Signature]

Sample Location / Sample ID (Reference to Data Base)	Time	Sampler / Measurement Type	HP-100 Probe (DINumber)	Static Count Time	GROSS Instrument Reading (cpm/0.01cm)	Comments (Indicate location of sample and material type) (media composition) as applicable
 IVP0000445	1434	Direct Static Measurement	S15564 (#109) 06/30/00	1.5 Minute	21.0	REF MEDIA SAMPLING painted concrete
 IVP0000446	1438	Direct Static Measurement		1.5 Minute	10.64	
 IVP0000447	1445	Direct Static Measurement		1.5 Minute	17.26	
 IVP0000448	1450	Direct Static Measurement		1.5 Minute	4.5	concrete
 IVP0000449	1454	Direct Static Measurement		1.5 Minute	11.18	concrete
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 779 Cluster / Building Survey Unit: 727-01 Date: 02/03/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samirhan Signature: Jay Cameron

Sample Location (e.g. VPR0000 386)	Time	Sample (Measurement Type)	BP Appr. (ID Number)	Static Time	Gross Reading (gpm/100 cm)	Comments (Indicate if temperature or other conditions apply)
VPR0000 386	0916	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	17.42	Post Median Survey
VPR0000 387	0921	Direct Static Measurement		1.5 Minute	20.7	
VPR0000 390	0932	Direct Static Measurement		1.5 Minute	17.6	
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

Form IVP-1000, July 1999
 Supervisory Review: A. Samirhan Signature: A. Samirhan Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-01 (Bdg. 727) Date: 2/2/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#32) Calibration Expires: 3/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: Jay Lanco

Sample Location / or Sample ID (at the core or at Bar Code)	Time	Sampler Measurement Type	HP-100 Probe ID Number	Static Count Time	GROSS Instrument Reading (cpm/0.9 cm)	Comments (Include description of source characteristics and media composition as applicable)
1VP0000396	1552	Direct Static Measurement	5115564 (#109) 06/30/00	1.5 Minute	7.56	POST-MEDIAN sampling
397	1556	Direct Static Measurement		1.5 Minute	4.32	
398	1600	Direct Static Measurement		1.5 Minute	18.02	
399	1604	Direct Static Measurement		1.5 Minute	4.16	
400	1610	Direct Static Measurement		1.5 Minute	14.15	
401	1616	Direct Static Measurement		1.5 Minute	17.57	
402	1620	Direct Static Measurement		1.5 Minute	24.8	

Form IVP-1000, July 1999

Supervisory Review: A. Sam. Lanco Signature: [Signature] Date: 1, 02/02/00 File Index Number: _____
 Print Name: _____

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INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS 179 Cluster / Building Survey Unit: 727-01 Date: 2/2/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: J. Cameron Signature: Gayle Cameron

Sample Location (or Sample ID) (Kilograms or Pounds)	Time (Minutes)	Sampler (Type)	Temperature (Degrees)	Static (Minutes)	Dynamic (Minutes)	Comments (Infectious sampling or other special instructions)
IVP0000403	1624	Direct Static Measurement	515564 #109 06/30/00	1.5 Minute	8.8	Post Median Sampling
404	1628	Direct Static Measurement		1.5 Minute	15.8	
405	1632	Direct Static Measurement		1.5 Minute	12.3	
406	1636	Direct Static Measurement		1.5 Minute	7.7	
407	1641	Direct Static Measurement		1.5 Minute	7.7	
408	1645	Direct Static Measurement		1.5 Minute	31.5	
409	1650	Direct Static Measurement		1.5 Minute	25.1	

Form IVP-1000, July 1999
 Supervisory Review: A. Sarriban Signature: [Signature] Date: 02/02/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline, E500 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samikhan Signature: [Signature]

Station Location (Reference to Grid or Section)	Time	Sampled Measurement (Type)	HP 100 Probe ID Number	Static Soak Time	Gross Reading (dbm/100cm)	Comments (Indicate Attenuation, Antenna, and Distance, and Interpretation, if applicable)
IVP 0000 367	1054	Direct Static Measurement	515564 #109 06/30/00	1.5 Minute	20.0	Post Media Sampling
368	1100	Direct Static Measurement		1.5 Minute	15.1	
369	0922	Direct Static Measurement		1.5 Minute	25.5	
370	1106	Direct Static Measurement		1.5 Minute	16.3	
371	1110	Direct Static Measurement		1.5 Minute	29.5	
372	1114	Direct Static Measurement		1.5 Minute	15.7	
373	0924	Direct Static Measurement		1.5 Minute	14.7	

Form IVP-1000, July 1999

Supervisory Review: A. Samikhan Signature: _____ Date: _____
 File Index Number: _____

Print Name

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INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REIS 779 Cluster / Building Survey Unit: 727-02 Date: 01-25-00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samikhan Signature: [Signature]

Sample Location (See Sample Log)	Time	Sampling Method (Direct Static Measurement)	Elapsed Time (min)	Static Count (cpm)	Gross Count Rate (cpm/90 sec)	Comments (Include all sample times, corrections, and calculations)
1VP0000 374	1122	Direct Static Measurement	5/15564 #109 06/30/00	1.5 Minute	22.6	Post Media Sampling
375	1124	Direct Static Measurement		1.5 Minute	9.0	
376	0930	Direct Static Measurement		1.5 Minute	22.0	
377	1129	Direct Static Measurement		1.5 Minute	8.8	
378	1132	Direct Static Measurement		1.5 Minute	15.8	
379	1138	Direct Static Measurement		1.5 Minute	12.3	
		Direct Static Measurement		1.5 Minute		

Form IVP-1000, July 1999
 Supervisory Review: A. Samikhan Signature: _____ Date: _____
 Print Name: _____
 File Index Number: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samirban Signature: Jay Cameron

Sampling Location (or Sample ID) (Kirkwood Solidification)	Time	Symbol Measurement Type	Barometer (Dinmbar)	Static Count Time	Gross Infiltration Reading (dpm/gallon)	Comments (Include all applicable corrections, and method of correction, if applicable)
1VP0000 301	1056	Direct Static Measurement	515564 4109 06/30/00	1.5 Minute	27.5	Post Median Sampling
302	1100	Direct Static Measurement		1.5 Minute	23.9	
303	1104	Direct Static Measurement		1.5 Minute	20.7	
304	1107	Direct Static Measurement		1.5 Minute	41.2	
305	1111	Direct Static Measurement		1.5 Minute	13.9	
306	1117	Direct Static Measurement		1.5 Minute	20.8	
307	1120	Direct Static Measurement		1.5 Minute	24.2	

Form IVP-1000, July 1999
 Supervisory Review: A. Samirban Signature: A. Samirban Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 179 Cluster / Building Survey Unit: 782-01 Date: 02/03/00
 Instrument Model Number: Eberline, E 500 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samikhan Signature: Jay Cameron

Sample Location (Tank or Solid Structure)	Time	Sample Measurement (Type)	HP Application (ID Number)	Static Gauge Time	Gross Reading (Density)	Comments (Indicate if temperature, pressure, humidity, and media composition are applicable)
WP 0000 308	1124	Direct Static Measurement	515564 #109 06/30/00	1.5 Minute	41.9	Post media sampling
309	1128	Direct Static Measurement		1.5 Minute	20.8	
310	1132	Direct Static Measurement		1.5 Minute	17.5	
311	1136	Direct Static Measurement		1.5 Minute	21.1	
312	1142	Direct Static Measurement		1.5 Minute	21.3	
313	1256	Direct Static Measurement		1.5 Minute	27.9	
314	1300	Direct Static Measurement		1.5 Minute	14.2	✓

Form IVP-1000, July 1999

Supervisory Review: A. Samikhan Signature: A. Samikhan Date: 02/03/00 File Index Number: _____
 Print Name: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: REETS, 779 Cluster / Building Date: 02/03/00
 Survey Unit: 782-01
 Instrument Model Number: Eberline, E 600 Calibration Expires: 03-23-00
 Detector Probe Type: Eberline, HP-100 Operator Name: A. Samikhan Signature: Jay Cameron

Sample Location / ID Number (if applicable)	Time	Sampling Method / Type	HP 100 Probe (On/Off)	Static Grounding (min)	Gross Volume (Gpm/100 sq. ft.)	Comments (Indicate if conditions are not suitable for testing)
1VP0000315	1304	Direct Static Measurement	515564 #109 06/30/00	1.5 Minute	14.1	post media measurement
1VP0000316	1308	Direct Static Measurement	↓	1.5 Minute	7.5	↓
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

Form IVP-1000, July 1999
 Supervisory Review: A. Samikhan Signature: A. Samikhan Date: 02/03/00 File Index Number: _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: RFETS, 779 Cluster/Building Date: 02/02/00
 Survey Unit: 782-02
 Instrument ID Number: 515564 (#321) Calibration Expires: 03-23-00
 Instrument Model Number: Eberline, E 600
 Operator Name: A. Samal Signature: [Signature]
 Detector Probe Type: Eberline, HP-100

Sampling Location (or Sample ID) (if not a coordinate)	Time	Sampler Method/Type	HP 100 Probe (DINUMIX)	Static Equip. Time	Gross Instrument Reading (cpm/109 cm)	Comments (Include net count, gross count, net rate, and model, probe position, etc. as applicable)
IVP0000421	0942	Direct Static Measurement	515564 P(321) (#109) 06/30/00	1.5 Minute	17.3	POST MEDIA SAMPLING
422	0945	Direct Static Measurement		1.5 Minute	3.5	
423	0950	Direct Static Measurement		1.5 Minute	27.3	
424	0955	Direct Static Measurement		1.5 Minute	31.0	
426	1007	Direct Static Measurement		1.5 Minute	17.33	
427	1017	Direct Static Measurement		1.5 Minute	3.79	
dup	1014	Direct Static Measurement		1.5 Minute	7.26	✓

Form IVP-1000, July 1999

Supervisory Review: _____ Signature _____ Date _____
 File Index Number _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: RFETS 779 Cluster / Building Survey Unit: 782-02 Date: 2/2/00
 Instrument Model Number: Eberline E 600 Instrument ID Number: 515622 (#321) Calibration Expires: 03-23-00
 Detector Probe Type: Eberline HP-100 Operator Name: A. Samalman Signature: A. Samalman

Sample Location (Reference to Plot Sheet)	Time	Sample Measurement Type	HP-100 Probe ID Number	Static Count Time	GROSS Measurement (Eberline)	Comments (Indicate if Completion of work, site, static, and method description, as applicable)
1VF0000430	1022	Direct Static Measurement	915564 HP (#321) (#109) 06/30/00	1.5 Minute	17.22	post MEDIA Sampling
431	1027	Direct Static Measurement		1.5 Minute	17.81	
432	1033	Direct Static Measurement		1.5 Minute	7.63	
433	1052	Direct Static Measurement		1.5 Minute	14.7	
434	1054	Direct Static Measurement		1.5 Minute	17.92	
435	1100	Direct Static Measurement		1.5 Minute	21.4 24.5 22	
dup	1102	Direct Static Measurement		1.5 Minute	14.77	

Form IVP-1000, July 1999

Supervisory Review: _____ Signature _____ Date _____
 File Index Number _____

INDEPENDENT VERIFICATION SURVEY DATA SHEET

Survey Location: RFETS, 779 Cluster / Building Survey Unit: 782-02 Date: 2/2/00
 Instrument Model Number: Eberline, E 600 Instrument ID Number: 515622 (#32) Calibration Expires: 3/23/00
 Detector Probe Type: Eberline, HP-100 Operator Name: D. Cameron Signature: [Signature]

Sample Location (Link or Record Bar Code)	Time	Sample or Measurement Type	HP-100 Probe ID Number	Static Count Time	Gross Reading (cpm/09/cm)	Comments (Include description of surface and media composition, if applicable)
IVP 0000 436	1117	Direct Static Measurement	815564 (#199) 02/30/00	1.5 Minute	18.17	post media sampling
437	1122	Direct Static Measurement		1.5 Minute	8.09	
438	1127	Direct Static Measurement		1.5 Minute	4.78	
440	1342	Direct Static Measurement		1.5 Minute	3.59	
441	1346	Direct Static Measurement		1.5 Minute	20.8	
442	1357	Direct Static Measurement		1.5 Minute	10.57	
443	1404	Direct Static Measurement		1.5 Minute	13.43	

Form IVP-1000, July 1999

Supervisory Review: A. Samblan Signature: [Signature] Date: 02-02-00 File Index Number: _____
 Print Name

Survey Location: REETS, 779 Cluster / Building Survey Unit: 782-02 Date: 2/2/00

Instrument Model Number: Eberline, E 600 Instrument ID Number: S15622 (#321) Calibration Expires: 03/23/00

Detector Probe Type: Eberline, HP-100 Operator Name: A. Sam. Nor Signature: [Signature]

Sample Location (or Sample ID) (if not recorded, EIR Code)	Time	Sample or Measurement Type	HP-100 Probe ID Number	Static (equi- time)	GROSS Instrument Reading (dpm/100 cm)	Comments (Include description of surface characteristics and media composition, if applicable)
WP0000444	1430	Direct Static Measurement	S155564 (#109) 06/30/00	1.5 Minute	4.67	POST MEDIA SAMPLING
445	1436	Direct Static Measurement		1.5 Minute	7.13 5.27	
446	1440	Direct Static Measurement		1.5 Minute	7.22	
447	1447	Direct Static Measurement		1.5 Minute	3.83	
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		
		Direct Static Measurement		1.5 Minute		

Background Data, Survey Unit 727-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)
BACKGROUND	2/2/00	15:30:00	321	109	Scaler	Alpha	Gross	7.93	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/2/00	15:32:00	321	109	Scaler	Alpha	Gross	11.30	dpm/100cm ²	0.1949	2.2
BACKGROUND	2/2/00	15:34:00	321	109	Scaler	Alpha	Gross	7.75	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/2/00	16:52:00	321	109	Scaler	Alpha	Gross	8.24	dpm/100cm ²	0.1949	1.6
BACKGROUND	2/2/00	16:54:00	321	109	Scaler	Alpha	Gross	8.32	dpm/100cm ²	0.1949	1.6
BACKGROUND	2/2/00	16:56:00	321	109	Scaler	Alpha	Gross	4.76	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	8:45:00	321	109	Scaler	Alpha	Gross	4.76	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	8:47:00	321	109	Scaler	Alpha	Gross	4.46	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	8:49:00	321	109	Scaler	Alpha	Gross	4.42	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	9:50:00	321	109	Scaler	Alpha	Gross	4.73	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	9:52:00	321	109	Scaler	Alpha	Gross	4.99	dpm/100cm ²	0.1949	1.0
BACKGROUND	2/3/00	9:54:00	321	109	Scaler	Alpha	Gross	7.56	dpm/100cm ²	0.1949	1.5

Summary Statistics

Number of Measurements 12
 Mean 6.6
 Log Normal Mean 6.284391
 Median 6.3
 Std. Deviation 2.2144806
 CV 0.3354427

Response Data, Survey Unit 727-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units
RESP/CHECK	2/2/00	15:36:00	321	109	Scaler	Alpha	Gross	1580	dpm/100cm ²
RESP/CHECK	2/2/00	15:38:00	321	109	Scaler	Alpha	Gross	1580	dpm/100cm ²
RESP/CHECK	2/2/00	15:41:00	321	109	Scaler	Alpha	Gross	1560	dpm/100cm ²
RESP/CHECK	2/2/00	16:58:00	321	109	Scaler	Alpha	Gross	1410	dpm/100cm ²
RESP/CHECK	2/2/00	16:59:00	321	109	Scaler	Alpha	Gross	1570	dpm/100cm ²
RESP/CHECK	2/2/00	17:01:00	321	109	Scaler	Alpha	Gross	1420	dpm/100cm ²
RESP/CHECK	2/3/00	8:51:00	321	109	Scaler	Alpha	Gross	1450	dpm/100cm ²
RESP/CHECK	2/3/00	8:52:00	321	109	Scaler	Alpha	Gross	1530	dpm/100cm ²
RESP/CHECK	2/3/00	8:54:00	321	109	Scaler	Alpha	Gross	1690	dpm/100cm ²
RESP/CHECK	2/3/00	9:58:00	321	109	Scaler	Alpha	Gross	1500	dpm/100cm ²
RESP/CHECK	2/3/00	10:00:00	321	109	Scaler	Alpha	Gross	1440	dpm/100cm ²
RESP/CHECK	2/3/00	10:07:00	321	109	Scaler	Alpha	Gross	1470	dpm/100cm ²

Probe #	Response	-20%	20%
109	1631	1305	1957

Direct Static Surface Contamination Measurements, Survey Unit 727-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000381	2/3/00	9:02:00	321	109	Scaler	Alpha	Gross	8.94	dpm/100cm ²	0.1949	1.7	90
IVP0000382	2/3/00	9:06:00	321	109	Scaler	Alpha	Gross	2.04	dpm/100cm ²	0.1949	0.4	90
IVP0000383	2/3/00	9:10:00	321	109	Scaler	Alpha	Gross	5.46	dpm/100cm ²	0.1949	1.1	90
IVP0000384	2/3/00	9:12:00	321	109	Scaler	Alpha	Gross	5.05	dpm/100cm ²	0.1949	1.0	90
IVP0000385	2/3/00	9:14:00	321	109	Scaler	Alpha	Gross	1.85	dpm/100cm ²	0.1949	0.4	90
IVP0000386	2/3/00	9:16:00	321	109	Scaler	Alpha	Gross	9.40	dpm/100cm ²	0.1949	1.8	90
IVP0000387	2/3/00	9:21:00	321	109	Scaler	Alpha	Gross	20.90	dpm/100cm ²	0.1949	4.1	90
IVP0000388	2/3/00	9:26:00	321	109	Scaler	Alpha	Gross	2.03	dpm/100cm ²	0.1949	0.4	90
IVP0000389	2/3/00	9:28:00	321	109	Scaler	Alpha	Gross	1.84	dpm/100cm ²	0.1949	0.4	90
IVP0000390	2/3/00	9:30:00	321	109	Scaler	Alpha	Gross	17.70	dpm/100cm ²	0.1949	3.4	90
IVP0000391	2/3/00	9:34:00	321	109	Scaler	Alpha	Gross	1.90	dpm/100cm ²	0.1949	0.4	90
IVP0000392	2/3/00	9:37:00	321	109	Scaler	Alpha	Gross	8.95	dpm/100cm ²	0.1949	1.7	90
IVP0000393	2/3/00	9:41:00	321	109	Scaler	Alpha	Gross	8.87	dpm/100cm ²	0.1949	1.7	90
IVP0000394	2/3/00	9:42:00	321	109	Scaler	Alpha	Gross	2.02	dpm/100cm ²	0.1949	0.4	90
IVP0000395	2/3/00	9:46:00	321	109	Scaler	Alpha	Gross	1.91	dpm/100cm ²	0.1949	0.4	90
IVP0000396	2/2/00	15:50:00	321	109	Scaler	Alpha	Gross	14.40	dpm/100cm ²	0.1949	2.8	90
IVP0000397	2/2/00	15:54:00	321	109	Scaler	Alpha	Gross	11.10	dpm/100cm ²	0.1949	2.2	90
IVP0000398	2/2/00	15:58:00	321	109	Scaler	Alpha	Gross	4.49	dpm/100cm ²	0.1949	0.9	90
IVP0000399	2/2/00	16:03:00	321	109	Scaler	Alpha	Gross	24.70	dpm/100cm ²	0.1949	4.8	90
IVP0000400	2/2/00	16:09:00	321	109	Scaler	Alpha	Gross	3.69	dpm/100cm ²	0.1949	0.7	90
IVP0000401	2/2/00	16:13:00	321	109	Scaler	Alpha	Gross	7.25	dpm/100cm ²	0.1949	1.4	90
IVP0000402	2/2/00	16:20:00	321	109	Scaler	Alpha	Gross	7.50	dpm/100cm ²	0.1949	1.5	90
IVP0000403	2/2/00	16:24:00	321	109	Scaler	Alpha	Gross	31.40	dpm/100cm ²	0.1949	6.1	90
IVP0000404	2/2/00	16:28:00	321	109	Scaler	Alpha	Gross	10.70	dpm/100cm ²	0.1949	2.1	90
IVP0000405	2/2/00	16:31:00	321	109	Scaler	Alpha	Gross	14.60	dpm/100cm ²	0.1949	2.8	90
IVP0000406	2/2/00	16:34:00	321	109	Scaler	Alpha	Gross	14.60	dpm/100cm ²	0.1949	2.8	90
IVP0000407	2/2/00	16:38:00	321	109	Scaler	Alpha	Gross	4.36	dpm/100cm ²	0.1949	0.8	90
IVP0000408	2/2/00	16:44:00	321	109	Scaler	Alpha	Gross	17.60	dpm/100cm ²	0.1949	3.4	90
IVP0000409	2/2/00	16:48:00	321	109	Scaler	Alpha	Gross	4.08	dpm/100cm ²	0.1949	0.8	90

Mean Of Replicate Measurements

Post Surface Media Sampling Direct Static Surface Measurements, Survey Unit 727-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000386	2/3/00	9:18:00	321	109	Scaler	Alpha	Gross	17.40	dpm/100cm ²	0.1949	3.4	90
IVP0000387	2/3/00	9:23:00	321	109	Scaler	Alpha	Gross	20.80	dpm/100cm ²	0.1949	4.1	90
IVP0000390	2/3/00	9:32:00	321	109	Scaler	Alpha	Gross	17.60	dpm/100cm ²	0.1949	3.4	90
IVP0000396	2/2/00	15:52:00	321	109	Scaler	Alpha	Gross	7.56	dpm/100cm ²	0.1949	1.5	90
IVP0000397	2/2/00	15:56:00	321	109	Scaler	Alpha	Gross	4.32	dpm/100cm ²	0.1949	0.8	90
IVP0000398	2/2/00	16:01:00	321	109	Scaler	Alpha	Gross	18.02	dpm/100cm ²	0.1949	3.5	90
IVP0000399	2/2/00	16:06:00	321	109	Scaler	Alpha	Gross	4.16	dpm/100cm ²	0.1949	0.8	90
IVP0000400	2/2/00	16:11:00	321	109	Scaler	Alpha	Gross	14.15	dpm/100cm ²	0.1949	2.8	90
IVP0000401	2/2/00	16:18:00	321	109	Scaler	Alpha	Gross	17.57	dpm/100cm ²	0.1949	3.4	90
IVP0000402	2/2/00	16:22:00	321	109	Scaler	Alpha	Gross	24.80	dpm/100cm ²	0.1949	4.8	90
IVP0000403	2/2/00	16:26:00	321	109	Scaler	Alpha	Gross	8.80	dpm/100cm ²	0.1949	1.7	90
IVP0000404	2/2/00	16:29:00	321	109	Scaler	Alpha	Gross	15.80	dpm/100cm ²	0.1949	3.1	90
IVP0000405	2/2/00	16:32:00	321	109	Scaler	Alpha	Gross	12.30	dpm/100cm ²	0.1949	2.4	90
IVP0000406	2/2/00	16:36:00	321	109	Scaler	Alpha	Gross	7.66	dpm/100cm ²	0.1949	1.5	90
IVP0000407	2/2/00	16:41:00	321	109	Scaler	Alpha	Gross	7.71	dpm/100cm ²	0.1949	1.5	90
IVP0000408	2/2/00	16:45:00	321	109	Scaler	Alpha	Gross	31.50	dpm/100cm ²	0.1949	6.1	90
IVP0000409	2/2/00	16:50:00	321	109	Scaler	Alpha	Gross	25.10	dpm/100cm ²	0.1949	4.9	90

Surface Media Sample Data, Survey Unit 727-01

Alpha Isotopic Analysis

Sample Location	Sample ID #	Lab Sample ID #	Sample Weight (grams)	Date Collected MM/DD/YYYY	Time Collected	Units	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity dpm/100 cm ²	Total Uranium Activity dpm/100 cm ²
							Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value		
VP0000396	MED0000396	264771	11.03	1/24/00	8:00	dpm/100 cm ²	0.88	0.88	1.29	0.65	1.81	0.91	31.11	1.98	0.93	30.98	2.43	63.02
VP0000397	MED0000397	264772	13.70	1/24/00	8:05	dpm/100 cm ²	1.36	1.36	0.51	0.28	1.07	0.54	60.87	2.91	1.31	59.34	2.15	121.32
VP0000398	MED0000398	264773	11.06	1/24/00	8:15	dpm/100 cm ²	1.45	1.45	0.82	0.41	1.11	0.58	29.24	2.28	2.28	30.58	2.42	62.06
VP0000399	MED0000399	264774	14.91	1/24/00	8:25	dpm/100 cm ²	0.57	0.57	1.16	0.58	2.03	1.02	22.16	2.55	1.28	24.88	2.17	48.12
VP0000400	MED0000400	264775	15.84	1/24/00	8:30	dpm/100 cm ²	1.72	1.72	1.07	0.54	1.07	0.54	28.33	1.89	1.00	28.77	2.79	54.10
VP0000401	MED0000401	264776	13.45	1/24/00	8:35	dpm/100 cm ²	1.20	1.20	0.51	0.28	1.08	0.99	19.85	1.17	0.59	19.77	1.85	40.21
VP0000402	MED0000402	264777	13.74	1/24/00	8:40	dpm/100 cm ²	1.44	1.44	1.00	0.50	1.00	0.50	20.26	2.15	1.08	18.08	2.44	39.42
VP0000403	MED0000403	264778	7.52	1/24/00	8:45	dpm/100 cm ²	2.23	2.23	0.57	0.29	0.78	0.39	13.44	1.41	0.71	13.28	2.91	27.41
VP0000404	MED0000404	264779	3.71	1/24/00	8:50	dpm/100 cm ²	0.91	0.91	0.31	0.18	1.34	1.34	3.17	0.46	0.23	3.43	2.41	6.83
VP0000405	MED0000405	264780	15.31	1/24/00	8:55	dpm/100 cm ²	1.55	1.55	0.50	0.25	1.28	0.63	19.05	2.51	1.28	23.17	2.43	43.48
VP0000406	MED0000406	264781	14.57	1/24/00	9:00	dpm/100 cm ²	1.49	1.49	1.15	0.58	1.56	0.78	20.18	3.15	1.58	18.90	2.10	40.96
VP0000407	MED0000407	264782	6.16	1/24/00	9:10	dpm/100 cm ²	2.04	2.04	0.75	0.38	1.39	1.39	6.04	1.08	0.54	6.67	3.81	13.25
VP0000408	MED0000408	264783	11.00	1/24/00	9:15	dpm/100 cm ²	0.85	0.85	0.91	0.48	1.48	0.73	12.13	1.87	0.84	14.08	2.04	27.15
VP0000409	MED0000409	264784	13.10	1/24/00	9:20	dpm/100 cm ²	1.83	1.83	0.44	0.22	0.91	0.46	21.90	1.89	0.85	19.92	2.31	42.78
VP0000410	MED0000410	264785	17.59	1/24/00	9:25	dpm/100 cm ²	2.88	2.88	1.74	0.87	1.97	0.99	31.75	3.11	1.86	32.05	4.54	65.36
VP0000411	MED0000411	264786	10.28	1/24/00	9:30	dpm/100 cm ²	0.90	0.90	1.32	0.66	1.22	0.61	16.23	1.89	0.85	14.27	2.17	31.45
VP0000412	MED0000412	264787	11.29	1/24/00	9:40	dpm/100 cm ²	1.54	1.54	1.07	0.54	1.44	0.72	19.07	1.25	0.63	15.14	2.80	34.84

Background Data, Survey Unit 727-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)
BACKGROUND	1/25/00	9:06:00	321	109	Scaler	Alpha	Gross	15.10	dpm/100cm ²	0.1949	2.9
BACKGROUND	1/25/00	9:08:00	321	109	Scaler	Alpha	Gross	8.45	dpm/100cm ²	0.1949	1.6
BACKGROUND	1/25/00	9:09:00	321	109	Scaler	Alpha	Gross	18.70	dpm/100cm ²	0.1949	3.6
BACKGROUND	1/25/00	10:21:00	321	109	Scaler	Alpha	Gross	14.90	dpm/100cm ²	0.1949	2.9
BACKGROUND	1/25/00	10:23:00	321	109	Scaler	Alpha	Gross	15.60	dpm/100cm ²	0.1949	3.0
BACKGROUND	1/25/00	10:25:00	321	109	Scaler	Alpha	Gross	22.50	dpm/100cm ²	0.1949	4.4
BACKGROUND	1/25/00	11:42:00	321	109	Scaler	Alpha	Gross	12.30	dpm/100cm ²	0.1949	2.4
BACKGROUND	1/25/00	11:44:00	321	109	Scaler	Alpha	Gross	10.30	dpm/100cm ²	0.1949	2.0
BACKGROUND	1/25/00	11:45:00	321	109	Scaler	Alpha	Gross	15.10	dpm/100cm ²	0.1949	2.9

Summary Statistics

Number of Measurements	9
Mean	14.8
Log Normal Mean	14.226519
Median	15.1
Std. Deviation	4.2152336
CV	0.2853486

Response Data, Survey Unit 727-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument		Background Compensation		Recorded Value	Units
					Operating Mode	Channel Selected	Mode			
RESP/CHECK	1/25/00	8:58:00	321	109	Scaler	Alpha	Gross		1450	dpm/100cm ²
RESP/CHECK	1/25/00	8:59:00	321	109	Scaler	Alpha	Gross		1450	dpm/100cm ²
RESP/CHECK	1/25/00	9:01:00	321	109	Scaler	Alpha	Gross		1490	dpm/100cm ²
RESP/CHECK	1/25/00	10:16:00	321	109	Scaler	Alpha	Gross		1610	dpm/100cm ²
RESP/CHECK	1/25/00	10:18:00	321	109	Scaler	Alpha	Gross		1520	dpm/100cm ²
RESP/CHECK	1/25/00	10:20:00	321	109	Scaler	Alpha	Gross		1570	dpm/100cm ²
RESP/CHECK	1/25/00	11:37:00	321	109	Scaler	Alpha	Gross		1530	dpm/100cm ²
RESP/CHECK	1/25/00	11:39:00	321	109	Scaler	Alpha	Gross		1500	dpm/100cm ²
RESP/CHECK	1/25/00	11:40:00	321	109	Scaler	Alpha	Gross		1440	dpm/100cm ²

Probe #	Response	-20%	20%
109	1631	1305	1957

Direct Static Surface Contamination Measurements, Survey Unit 727-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000351	1/25/00	9:59:00	321	109	Scaler	Alpha	Gross	12.30	dpm/100cm ²	0.1949	2.4	90
IVP0000352	1/25/00	10:00:00	321	109	Scaler	Alpha	Gross	8.82	dpm/100cm ²	0.1949	1.7	90
IVP0000353	1/25/00	10:02:00	321	109	Scaler	Alpha	Gross	21.50	dpm/100cm ²	0.1949	4.2	90
IVP0000354	1/25/00	10:04:00	321	109	Scaler	Alpha	Gross	20.10	dpm/100cm ²	0.1949	3.9	90
IVP0000355	1/25/00	10:06:00	321	109	Scaler	Alpha	Gross	15.70	dpm/100cm ²	0.1949	3.1	90
IVP0000356	1/25/00	10:08:00	321	109	Scaler	Alpha	Gross	17.30	dpm/100cm ²	0.1949	3.4	90
IVP0000357	1/25/00	10:27:00	321	109	Scaler	Alpha	Gross	21.90	dpm/100cm ²	0.1949	4.3	90
IVP0000358	1/25/00	10:29:00	321	109	Scaler	Alpha	Gross	20.50	dpm/100cm ²	0.1949	4.0	90
IVP0000359	1/25/00	10:32:00	321	109	Scaler	Alpha	Gross	21.10	dpm/100cm ²	0.1949	4.1	90
IVP0000360	1/25/00	10:34:00	321	109	Scaler	Alpha	Gross	20.60	dpm/100cm ²	0.1949	4.0	90
IVP0000361	1/25/00	10:37:00	321	109	Scaler	Alpha	Gross	12.40	dpm/100cm ²	0.1949	2.4	90
IVP0000362	1/25/00	10:39:00	321	109	Scaler	Alpha	Gross	22.40	dpm/100cm ²	0.1949	4.4	90
IVP0000363	1/25/00	10:43:00	321	109	Scaler	Alpha	Gross	19.40	dpm/100cm ²	0.1949	3.8	90
IVP0000364	1/25/00	10:44:00	321	109	Scaler	Alpha	Gross	13.40	dpm/100cm ²	0.1949	2.6	90
IVP0000365	1/25/00	10:46:00	321	109	Scaler	Alpha	Gross	29.90	dpm/100cm ²	0.1949	5.8	90
IVP0000366	1/25/00	10:52:00	321	109	Scaler	Alpha	Gross	19.10	dpm/100cm ²	0.1949	3.7	90
IVP0000367	1/25/00	10:54:00	321	109	Scaler	Alpha	Gross	22.00	dpm/100cm ²	0.1949	4.3	90
IVP0000368	1/25/00	10:56:00	321	109	Scaler	Alpha	Gross	14.70	dpm/100cm ²	0.1949	2.9	90
IVP0000369	1/25/00	9:19:00	321	109	Scaler	Alpha	Gross	24.90	dpm/100cm ²	0.1949	4.9	90
IVP0000370	1/25/00	11:04:00	321	109	Scaler	Alpha	Gross	18.90	dpm/100cm ²	0.1949	3.7	90
IVP0000371	1/25/00	11:07:00	321	109	Scaler	Alpha	Gross	36.30	dpm/100cm ²	0.1949	7.1	90
IVP0000372	1/25/00	11:12:00	321	109	Scaler	Alpha	Gross	29.40	dpm/100cm ²	0.1949	5.7	90
IVP0000373	1/25/00	9:23:00	321	109	Scaler	Alpha	Gross	24.70	dpm/100cm ²	0.1949	4.8	90
IVP0000374	1/25/00	11:16:00	321	109	Scaler	Alpha	Gross	15.80	dpm/100cm ²	0.1949	3.1	90
IVP0000375	1/25/00	11:24:00	321	109	Scaler	Alpha	Gross	15.80	dpm/100cm ²	0.1949	3.1	90
IVP0000376	1/25/00	9:27:00	321	109	Scaler	Alpha	Gross	24.80	dpm/100cm ²	0.1949	4.8	90
IVP0000377	1/25/00	11:28:00	321	109	Scaler	Alpha	Gross	8.82	dpm/100cm ²	0.1949	1.7	90
IVP0000378	1/25/00	11:31:00	321	109	Scaler	Alpha	Gross	19.10	dpm/100cm ²	0.1949	3.7	90
IVP0000379	1/25/00	11:33:00	321	109	Scaler	Alpha	Gross	19.40	dpm/100cm ²	0.1949	3.8	90

Mean Of Replicate Measurements

Post Surface Media Sampling Direct Static Surface Measurements, Survey Unit 727-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000367	1/25/00	10:54:00	321	109	Scaler	Alpha	Gross	20.00	dpm/100cm ²	0.1949	3.9	90
IVP0000368	1/25/00	11:00:00	321	109	Scaler	Alpha	Gross	15.10	dpm/100cm ²	0.1949	2.9	90
IVP0000369	1/25/00	9:21:00	321	109	Scaler	Alpha	Gross	25.50	dpm/100cm ²	0.1949	5.0	90
IVP0000370	1/25/00	11:05:00	321	109	Scaler	Alpha	Gross	16.30	dpm/100cm ²	0.1949	3.2	90
IVP0000371	1/25/00	11:09:00	321	109	Scaler	Alpha	Gross	29.50	dpm/100cm ²	0.1949	5.7	90
IVP0000372	1/25/00	11:14:00	321	109	Scaler	Alpha	Gross	15.70	dpm/100cm ²	0.1949	3.1	90
IVP0000373	1/25/00	9:24:00	321	109	Scaler	Alpha	Gross	14.70	dpm/100cm ²	0.1949	2.9	90
IVP0000374	1/25/00	11:22:00	321	109	Scaler	Alpha	Gross	22.60	dpm/100cm ²	0.1949	4.4	90
IVP0000375	1/25/00	11:26:00	321	109	Scaler	Alpha	Gross	9.03	dpm/100cm ²	0.1949	1.8	90
IVP0000376	1/25/00	9:29:00	321	109	Scaler	Alpha	Gross	22.00	dpm/100cm ²	0.1949	4.3	90
IVP0000377	1/25/00	11:29:00	321	109	Scaler	Alpha	Gross	8.80	dpm/100cm ²	0.1949	1.7	90
IVP0000378	1/25/00	11:32:00	321	109	Scaler	Alpha	Gross	15.80	dpm/100cm ²	0.1949	3.1	90
IVP0000379	1/25/00	11:37:00	321	109	Scaler	Alpha	Gross	12.30	dpm/100cm ²	0.1949	2.4	90

Surface Media Sample Data, 727-02

Alpha Isotopic Analysis

Sample Location	Sample ID #	Lab Sample ID #	Sample Weight	Date Collected	Time Collected	Units	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
							Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA		Reported Value	Reported Values w/samples < MDA at 0.5 MDA			
			(grams)	MM/DD/YYYY														
IVP0000387	MED0000387	284788	17.16	1/24/00	12:30	dpm/100 cm ²	2.02	2.02	0.63	0.32	2.43	1.22	42.31	2.47	2.47	37.69	3.55	82.47
IVP0000388	MED0000388	284789	19.23	1/24/00	12:40	dpm/100 cm ²	2.20	2.20	1.05	0.53	1.28	0.84	28.33	3.10	1.55	28.55	3.37	58.43
IVP0000389	MED0000389	284790	13.04	1/24/00	12:45	dpm/100 cm ²	1.05	0.53	0.46	0.23	1.34	0.87	0.75	1.63	0.62	0.74	1.43	2.31
IVP0000370	MED0000370	284791	16.95	1/24/00	12:50	dpm/100 cm ²	2.27	2.27	0.57	0.29	2.76	2.76	35.07	2.41	2.41	37.52	5.32	75.00
IVP0000371	MED0000371	284792	11.84	1/24/00	12:55	dpm/100 cm ²	1.51	1.51	0.35	0.18	1.00	0.50	23.21	1.92	0.96	24.34	2.19	48.51
IVP0000372	MED0000372	284793	15.31	1/24/00	13:05	dpm/100 cm ²	1.73	1.73	1.20	0.60	1.37	0.89	35.29	3.43	1.72	37.86	3.02	74.87
IVP0000373	MED0000373	284794	7.01	1/24/00	13:10	dpm/100 cm ²	0.59	0.30	0.61	0.31	0.54	0.27	0.43	0.84	0.42	0.43	0.87	1.28
IVP0000374	MED0000374	284795	15.42	1/24/00	13:15	dpm/100 cm ²	1.62	1.62	1.30	0.65	1.76	0.88	35.06	3.30	3.30	32.89	3.15	71.25
IVP0000375	MED0000375	284796	13.25	1/24/00	13:20	dpm/100 cm ²	4.92	4.92	0.43	0.22	3.07	3.07	18.81	1.69	0.65	18.41	6.21	38.07
IVP0000376	MED0000376	284797	5.01	1/24/00	13:25	dpm/100 cm ²	0.38	0.19	0.40	0.20	0.45	0.23	0.30	0.78	0.38	1.00	0.62	1.68
IVP0000377	MED0000377	284798	15.08	1/24/00	13:35	dpm/100 cm ²	2.53	2.53	1.69	0.85	2.11	1.06	27.94	3.20	1.60	31.02	4.43	60.56
IVP0000378	MED0000378	284799	18.80	1/24/00	13:40	dpm/100 cm ²	1.25	1.25	1.85	0.93	2.48	1.24	48.91	3.36	3.36	48.71	3.42	101.98
IVP0000379	MED0000379	284800	15.20	1/24/00	13:45	dpm/100 cm ²	1.87	1.87	0.61	0.31	1.28	0.63	33.85	2.55	1.28	32.93	2.81	68.06

Background Data, Survey Unit 782-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)
BACKGROUND	2/3/00	10:32:00	321	109	Scaler	Alpha	Gross	1.30	dpm/100cm ²	0.1949	0.3
BACKGROUND	2/3/00	10:34:00	321	109	Scaler	Alpha	Gross	1.13	dpm/100cm ²	0.1949	0.2
BACKGROUND	2/3/00	10:35:00	321	109	Scaler	Alpha	Gross	4.80	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	11:41:00	321	109	Scaler	Alpha	Gross	4.84	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	11:43:00	321	109	Scaler	Alpha	Gross	4.70	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	11:45:00	321	109	Scaler	Alpha	Gross	4.61	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/3/00	12:45:00	321	109	Scaler	Alpha	Gross	1.19	dpm/100cm ²	0.1949	0.2
BACKGROUND	2/3/00	12:47:00	321	109	Scaler	Alpha	Gross	14.70	dpm/100cm ²	0.1949	2.9
BACKGROUND	2/3/00	12:48:00	321	109	Scaler	Alpha	Gross	7.93	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/3/00	13:59:00	321	109	Scaler	Alpha	Gross	15.80	dpm/100cm ²	0.1949	3.1
BACKGROUND	2/3/00	14:01:00	321	109	Scaler	Alpha	Gross	12.30	dpm/100cm ²	0.1949	2.4
BACKGROUND	2/3/00	14:02:00	321	109	Scaler	Alpha	Gross	15.70	dpm/100cm ²	0.1949	3.1

Summary Statistics

Number of Measurements	12
Mean	7.4
Log Normal Mean	5.1045666
Median	4.8
Std. Deviation	5.7247649
CV	0.7718784

Response Data, Survey Unit 782-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units
RESP/CHECK	2/3/00	10:37:00	321	109	Scaler	Alpha	Gross	1570	dpm/100cm ²
RESP/CHECK	2/3/00	10:39:00	321	109	Scaler	Alpha	Gross	1560	dpm/100cm ²
RESP/CHECK	2/3/00	10:41:00	321	109	Scaler	Alpha	Gross	1550	dpm/100cm ²
RESP/CHECK	2/3/00	11:46:00	321	109	Scaler	Alpha	Gross	1390	dpm/100cm ²
RESP/CHECK	2/3/00	11:48:00	321	109	Scaler	Alpha	Gross	1530	dpm/100cm ²
RESP/CHECK	2/3/00	11:50:00	321	109	Scaler	Alpha	Gross	1490	dpm/100cm ²
RESP/CHECK	2/3/00	12:50:00	321	109	Scaler	Alpha	Gross	1570	dpm/100cm ²
RESP/CHECK	2/3/00	12:52:00	321	109	Scaler	Alpha	Gross	1520	dpm/100cm ²
RESP/CHECK	2/3/00	12:54:00	321	109	Scaler	Alpha	Gross	1670	dpm/100cm ²
RESP/CHECK	2/3/00	13:52:00	321	109	Scaler	Alpha	Gross	1440	dpm/100cm ²
RESP/CHECK	2/3/00	13:54:00	321	109	Scaler	Alpha	Gross	1460	dpm/100cm ²
RESP/CHECK	2/3/00	13:56:00	321	109	Scaler	Alpha	Gross	1450	dpm/100cm ²

Probe #	Response	-20%	20%
109	1631	1305	1957

Direct Static Surface Contamination Measurements, Survey Unit 782-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000301	2/3/00	10:55:00	321	109	Scaler	Alpha	Gross	34.50	dpm/100cm ²	0.1949	6.7	90
IVP0000302	2/3/00	10:59:00	321	109	Scaler	Alpha	Gross	31.10	dpm/100cm ²	0.1949	6.1	90
IVP0000303	2/3/00	11:02:00	321	109	Scaler	Alpha	Gross	13.80	dpm/100cm ²	0.1949	2.7	90
IVP0000304	2/3/00	11:06:00	321	109	Scaler	Alpha	Gross	24.10	dpm/100cm ²	0.1949	4.7	90
IVP0000305	2/3/00	11:09:00	321	109	Scaler	Alpha	Gross	17.50	dpm/100cm ²	0.1949	3.4	90
IVP0000306	2/3/00	11:12:00	321	109	Scaler	Alpha	Gross	12.25	dpm/100cm ²	0.1949	2.4	90
IVP0000307	2/3/00	11:17:00	321	109	Scaler	Alpha	Gross	24.20	dpm/100cm ²	0.1949	4.7	90
IVP0000308	2/3/00	11:21:00	321	109	Scaler	Alpha	Gross	24.10	dpm/100cm ²	0.1949	4.7	90
IVP0000309	2/3/00	11:25:00	321	109	Scaler	Alpha	Gross	14.10	dpm/100cm ²	0.1949	2.7	90
IVP0000310	2/3/00	11:28:00	321	109	Scaler	Alpha	Gross	7.36	dpm/100cm ²	0.1949	1.4	90
IVP0000311	2/3/00	11:32:00	321	109	Scaler	Alpha	Gross	10.90	dpm/100cm ²	0.1949	2.1	90
IVP0000312	2/3/00	11:36:00	321	109	Scaler	Alpha	Gross	10.95	dpm/100cm ²	0.1949	2.1	90
IVP0000313	2/3/00	12:56:00	321	109	Scaler	Alpha	Gross	7.08	dpm/100cm ²	0.1949	1.4	90
IVP0000314	2/3/00	12:59:00	321	109	Scaler	Alpha	Gross	10.80	dpm/100cm ²	0.1949	2.1	90
IVP0000315	2/3/00	13:03:00	321	109	Scaler	Alpha	Gross	17.50	dpm/100cm ²	0.1949	3.4	90
IVP0000316	2/3/00	13:06:00	321	109	Scaler	Alpha	Gross	10.90	dpm/100cm ²	0.1949	2.1	90
IVP0000317	2/3/00	13:14:00	321	109	Scaler	Alpha	Gross	3.73	dpm/100cm ²	0.1949	0.7	90
IVP0000318	2/3/00	13:16:00	321	109	Scaler	Alpha	Gross	1.20	dpm/100cm ²	0.1949	0.2	90
IVP0000319	2/3/00	13:20:00	321	109	Scaler	Alpha	Gross	1.34	dpm/100cm ²	0.1949	0.3	90
IVP0000320	2/3/00	13:21:00	321	109	Scaler	Alpha	Gross	8.01	dpm/100cm ²	0.1949	1.6	90
IVP0000321	2/3/00	13:23:00	321	109	Scaler	Alpha	Gross	4.66	dpm/100cm ²	0.1949	0.9	90
IVP0000322	2/3/00	13:26:00	321	109	Scaler	Alpha	Gross	11.00	dpm/100cm ²	0.1949	2.1	90
IVP0000323	2/3/00	13:28:00	321	109	Scaler	Alpha	Gross	11.50	dpm/100cm ²	0.1949	2.2	90
IVP0000324	2/3/00	13:32:00	321	109	Scaler	Alpha	Gross	7.79	dpm/100cm ²	0.1949	1.5	90
IVP0000325	2/3/00	13:39:00	321	109	Scaler	Alpha	Gross	4.68	dpm/100cm ²	0.1949	0.9	90
IVP0000326	2/3/00	13:40:00	321	109	Scaler	Alpha	Gross	18.30	dpm/100cm ²	0.1949	3.6	90
IVP0000327	2/3/00	13:42:00	321	109	Scaler	Alpha	Gross	14.90	dpm/100cm ²	0.1949	2.9	90
IVP0000328	2/3/00	13:44:00	321	109	Scaler	Alpha	Gross	8.20	dpm/100cm ²	0.1949	1.6	90
IVP0000329	2/3/00	13:47:00	321	109	Scaler	Alpha	Gross	1.34	dpm/100cm ²	0.1949	0.3	90

Mean Of Replicate Measurements

Post Surface Media Sampling Direct Static Surface Measurements, Survey Unit 782-01

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000301	2/3/00	10:57:00	321	109	Scaler	Alpha	Gross	27.60	dpm/100cm ²	0.1949	5.4	90
IVP0000302	2/3/00	11:00:00	321	109	Scaler	Alpha	Gross	24.00	dpm/100cm ²	0.1949	4.7	90
IVP0000303	2/3/00	11:04:00	321	109	Scaler	Alpha	Gross	20.70	dpm/100cm ²	0.1949	4.0	90
IVP0000304	2/3/00	11:07:00	321	109	Scaler	Alpha	Gross	41.30	dpm/100cm ²	0.1949	8.0	90
IVP0000305	2/3/00	11:11:00	321	109	Scaler	Alpha	Gross	13.90	dpm/100cm ²	0.1949	2.7	90
IVP0000306	2/3/00	11:16:00	321	109	Scaler	Alpha	Gross	20.90	dpm/100cm ²	0.1949	4.1	90
IVP0000307	2/3/00	11:19:00	321	109	Scaler	Alpha	Gross	24.30	dpm/100cm ²	0.1949	4.7	90
IVP0000308	2/3/00	11:23:00	321	109	Scaler	Alpha	Gross	41.90	dpm/100cm ²	0.1949	8.2	90
IVP0000309	2/3/00	11:27:00	321	109	Scaler	Alpha	Gross	20.90	dpm/100cm ²	0.1949	4.1	90
IVP0000310	2/3/00	11:30:00	321	109	Scaler	Alpha	Gross	17.50	dpm/100cm ²	0.1949	3.4	90
IVP0000311	2/3/00	11:33:00	321	109	Scaler	Alpha	Gross	21.10	dpm/100cm ²	0.1949	4.1	90
IVP0000312	2/3/00	11:39:00	321	109	Scaler	Alpha	Gross	21.30	dpm/100cm ²	0.1949	4.2	90
IVP0000313	2/3/00	12:58:00	321	109	Scaler	Alpha	Gross	27.90	dpm/100cm ²	0.1949	5.4	90
IVP0000314	2/3/00	13:01:00	321	109	Scaler	Alpha	Gross	14.20	dpm/100cm ²	0.1949	2.8	90
IVP0000315	2/3/00	13:04:00	321	109	Scaler	Alpha	Gross	14.10	dpm/100cm ²	0.1949	2.7	90
IVP0000316	2/3/00	13:08:00	321	109	Scaler	Alpha	Gross	7.49	dpm/100cm ²	0.1949	1.5	90

Surface Media Sample Data, Survey Unit 782-01

Alpha Isotopic Analysis

Sample Location	Sample ID #	Lab Sample ID #	Sample Weight (grams)	Date Collected	Time Collected	Units	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
				MM/DD/YY			Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	dpn/100 cm ²	dpn/100 cm ²
VP0000301	MED0000301	264870	8.07	1/28/00	7:45	dpn/100 cm ²	1.20	0.35	0.18	0.20	0.39	0.20	30.81	1.92	1.92	31.96	1.57	84.49
VP0000302	MED0000302	264871	11.30	1/28/00	7:50	dpn/100 cm ²	0.73	0.10	0.05	0.36	0.72	0.36	22.99	1.84	0.82	22.87	1.14	46.66
VP0000303	MED0000303	264872	11.12	1/28/00	7:55	dpn/100 cm ²	0.74	0.26	0.13	0.26	0.55	0.26	25.33	1.43	1.43	27.72	0.78	54.48
VP0000304	MED0000304	264873	12.10	1/28/00	8:00	dpn/100 cm ²	1.19	0.21	0.11	0.27	0.53	0.27	25.81	7.02	7.02	24.13	0.97	56.96
VP0000305	MED0000305	264874	10.47	1/28/00	8:05	dpn/100 cm ²	0.66	0.16	0.06	0.13	0.28	0.13	18.06	0.82	0.46	17.25	0.54	35.70
VP0000306	MED0000306	264875	8.24	1/28/00	8:10	dpn/100 cm ²	0.82	0.06	0.04	0.27	0.54	0.27	28.21	1.36	1.36	27.63	1.13	57.20
VP0000307	MED0000307	264876	13.70	1/28/00	8:15	dpn/100 cm ²	2.38	0.06	0.04	0.24	0.47	0.24	28.33	0.55	0.28	27.30	2.66	53.91
VP0000308	MED0000308	264877	10.82	1/28/00	8:20	dpn/100 cm ²	1.04	0.26	0.15	0.37	0.74	0.37	32.45	1.59	1.59	30.82	1.04	64.96
VP0000309	MED0000309	264878	8.18	1/28/00	8:25	dpn/100 cm ²	0.70	0.15	0.06	0.13	0.26	0.13	17.89	1.18	1.18	19.37	0.91	36.44
VP0000310	MED0000310	264879	15.18	1/28/00	8:30	dpn/100 cm ²	1.81	0.33	0.17	0.71	1.41	0.71	10.89	0.15	0.08	8.14	2.88	18.91
VP0000311	MED0000311	264880	9.24	1/28/00	8:35	dpn/100 cm ²	1.79	0.10	0.05	0.00	0.00	0.00	21.53	2.25	2.25	19.08	1.84	42.86
VP0000312	MED0000312	264881	11.84	1/28/00	8:40	dpn/100 cm ²	0.76	0.00	0.00	0.16	0.32	0.16	24.39	1.62	0.81	27.06	0.54	52.26
VP0000313	MED0000313	264882	11.11	1/28/00	8:45	dpn/100 cm ²	1.20	0.21	0.11	0.29	0.57	0.29	36.84	1.38	0.86	37.13	1.59	74.66
VP0000314	MED0000314	264883	10.10	1/28/00	8:50	dpn/100 cm ²	1.55	0.10	0.05	0.16	0.35	0.16	18.28	1.29	1.29	18.76	1.78	38.35
VP0000315	MED0000315	264884	9.16	1/28/00	8:55	dpn/100 cm ²	0.72	0.05	0.03	0.42	0.84	0.42	32.07	1.36	1.36	32.36	1.17	65.79
VP0000316	MED0000316	264885	9.19	1/28/00	9:00	dpn/100 cm ²	1.89	0.36	0.18	0.32	0.64	0.32	21.61	1.67	1.67	20.27	2.39	43.55

Background Data, Survey Unit 782-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)
BACKGROUND	2/2/00	9:29:00	321	109	Scaler	Alpha	Gross	4.62	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/2/00	9:31:00	321	109	Scaler	Alpha	Gross	14.70	dpm/100cm ²	0.1949	2.9
BACKGROUND	2/2/00	9:33:00	321	109	Scaler	Alpha	Gross	7.95	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/2/00	10:42:00	321	109	Scaler	Alpha	Gross	8.42	dpm/100cm ²	0.1949	1.6
BACKGROUND	2/2/00	10:43:00	321	109	Scaler	Alpha	Gross	22.20	dpm/100cm ²	0.1949	4.3
BACKGROUND	2/2/00	10:45:00	321	109	Scaler	Alpha	Gross	22.10	dpm/100cm ²	0.1949	4.3
BACKGROUND	2/2/00	11:39:00	321	109	Scaler	Alpha	Gross	14.30	dpm/100cm ²	0.1949	2.8
BACKGROUND	2/2/00	11:40:00	321	109	Scaler	Alpha	Gross	7.67	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/2/00	11:42:00	321	109	Scaler	Alpha	Gross	28.10	dpm/100cm ²	0.1949	5.5
BACKGROUND	2/2/00	13:19:00	321	109	Scaler	Alpha	Gross	7.87	dpm/100cm ²	0.1949	1.5
BACKGROUND	2/2/00	13:21:00	321	109	Scaler	Alpha	Gross	8.14	dpm/100cm ²	0.1949	1.6
BACKGROUND	2/2/00	13:22:00	321	109	Scaler	Alpha	Gross	4.61	dpm/100cm ²	0.1949	0.9
BACKGROUND	2/2/00	15:00:00	321	109	Scaler	Alpha	Gross	11.50	dpm/100cm ²	0.1949	2.2
BACKGROUND	2/2/00	15:01:00	321	109	Scaler	Alpha	Gross	8.32	dpm/100cm ²	0.1949	1.6
BACKGROUND	2/2/00	15:03:00	321	109	Scaler	Alpha	Gross	4.94	dpm/100cm ²	0.1949	1.0

Summary Statistics

Number of Measurements 15
 Mean 11.7
 Log Normal Mean 9.9725138
 Median 8.3
 Std. Deviation 7.2165017
 CV 0.617006

Response Data, Survey Unit 782-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units
RESP/CHECK	2/2/00	9:21:00	321	109	Scaler	Alpha	Gross	1500	dpm/100cm ²
RESP/CHECK	2/2/00	9:23:00	321	109	Scaler	Alpha	Gross	1590	dpm/100cm ²
RESP/CHECK	2/2/00	9:24:00	321	109	Scaler	Alpha	Gross	1450	dpm/100cm ²
RESP/CHECK	2/2/00	10:34:00	321	109	Scaler	Alpha	Gross	1410	dpm/100cm ²
RESP/CHECK	2/2/00	10:35:00	321	109	Scaler	Alpha	Gross	1450	dpm/100cm ²
RESP/CHECK	2/2/00	10:39:00	321	109	Scaler	Alpha	Gross	1360	dpm/100cm ²
RESP/CHECK	2/2/00	11:33:00	321	109	Scaler	Alpha	Gross	1500	dpm/100cm ²
RESP/CHECK	2/2/00	11:35:00	321	109	Scaler	Alpha	Gross	1500	dpm/100cm ²
RESP/CHECK	2/2/00	11:36:00	321	109	Scaler	Alpha	Gross	1550	dpm/100cm ²
RESP/CHECK	2/2/00	13:24:00	321	109	Scaler	Alpha	Gross	1550	dpm/100cm ²
RESP/CHECK	2/2/00	13:28:00	321	109	Scaler	Alpha	Gross	1680	dpm/100cm ²
RESP/CHECK	2/2/00	13:30:00	321	109	Scaler	Alpha	Gross	1510	dpm/100cm ²
RESP/CHECK	2/2/00	15:05:00	321	109	Scaler	Alpha	Gross	1400	dpm/100cm ²
RESP/CHECK	2/2/00	15:07:00	321	109	Scaler	Alpha	Gross	1350	dpm/100cm ²
RESP/CHECK	2/2/00	15:09:00	321	109	Scaler	Alpha	Gross	1410	dpm/100cm ²

Probe #	Response	-20%	20%
109	1631	1305	1957

Direct Static Surface Contamination Measurements, Survey Unit 782-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000421	2/2/00	9:37:00	321	109	Scaler	Alpha	Gross	10.40	dpm/100cm ²	0.1949	2.0	90
IVP0000422	2/2/00	9:41:00	321	109	Scaler	Alpha	Gross	24.10	dpm/100cm ²	0.1949	4.7	90
IVP0000423	2/2/00	9:45:00	321	109	Scaler	Alpha	Gross	20.60	dpm/100cm ²	0.1949	4.0	90
IVP0000424	2/2/00	9:51:00	321	109	Scaler	Alpha	Gross	6.94	dpm/100cm ²	0.1949	1.4	90
IVP0000425	2/2/00	9:57:00	321	109	Scaler	Alpha	Gross	17.50	dpm/100cm ²	0.1949	3.4	90
IVP0000426	2/2/00	10:00:00	321	109	Scaler	Alpha	Gross	14.00	dpm/100cm ²	0.1949	2.7	90
IVP0000427	2/2/00	10:08:00	321	109	Scaler	Alpha	Gross	3.96	dpm/100cm ²	0.1949	0.8	90
IVP0000428	2/2/00	10:14:00	321	109	Scaler	Alpha	Gross	7.26	dpm/100cm ²	0.1949	1.4	90
IVP0000429	2/2/00	10:16:00	321	109	Scaler	Alpha	Gross	7.15	dpm/100cm ²	0.1949	1.4	90
IVP0000430	2/2/00	10:19:00	321	109	Scaler	Alpha	Gross	7.23	dpm/100cm ²	0.1949	1.4	90
IVP0000431	2/2/00	10:23:00	321	109	Scaler	Alpha	Gross	11.10	dpm/100cm ²	0.1949	2.2	90
IVP0000432	2/2/00	10:27:00	321	109	Scaler	Alpha	Gross	9.45	dpm/100cm ²	0.1949	1.8	90
IVP0000433	2/2/00	10:48:00	321	109	Scaler	Alpha	Gross	1.10	dpm/100cm ²	0.1949	0.2	90
IVP0000434	2/2/00	10:54:00	321	109	Scaler	Alpha	Gross	7.71	dpm/100cm ²	0.1949	1.5	90
IVP0000435	2/2/00	11:01:00	321	109	Scaler	Alpha	Gross	21.50	dpm/100cm ²	0.1949	4.2	90
IVP0000436	2/2/00	11:14:00	321	109	Scaler	Alpha	Gross	18.30	dpm/100cm ²	0.1949	3.6	90
IVP0000437	2/2/00	11:18:00	321	109	Scaler	Alpha	Gross	15.00	dpm/100cm ²	0.1949	2.9	90
IVP0000438	2/2/00	11:22:00	321	109	Scaler	Alpha	Gross	18.35	dpm/100cm ²	0.1949	3.6	90
IVP0000439	2/2/00	11:28:00	321	109	Scaler	Alpha	Gross	12.00	dpm/100cm ²	0.1949	2.3	90
IVP0000440	2/2/00	13:38:00	321	109	Scaler	Alpha	Gross	10.50	dpm/100cm ²	0.1949	2.0	90
IVP0000441	2/2/00	13:47:00	321	109	Scaler	Alpha	Gross	3.55	dpm/100cm ²	0.1949	0.7	90
IVP0000442	2/2/00	13:56:00	321	109	Scaler	Alpha	Gross	3.44	dpm/100cm ²	0.1949	0.7	90
IVP0000443	2/2/00	14:03:00	321	109	Scaler	Alpha	Gross	17.40	dpm/100cm ²	0.1949	3.4	90
IVP0000444	2/2/00	14:10:00	321	109	Scaler	Alpha	Gross	19.05	dpm/100cm ²	0.1949	3.7	90
IVP0000445	2/2/00	14:35:00	321	109	Scaler	Alpha	Gross	21.00	dpm/100cm ²	0.1949	4.1	90
IVP0000446	2/2/00	14:40:00	321	109	Scaler	Alpha	Gross	10.60	dpm/100cm ²	0.1949	2.1	90
IVP0000447	2/2/00	14:47:00	321	109	Scaler	Alpha	Gross	17.30	dpm/100cm ²	0.1949	3.4	90
IVP0000448	2/2/00	14:53:00	321	109	Scaler	Alpha	Gross	4.16	dpm/100cm ²	0.1949	0.8	90
IVP0000449	2/2/00	14:56:00	321	109	Scaler	Alpha	Gross	11.20	dpm/100cm ²	0.1949	2.2	90

Mean Of Replicate Measurements

Post Surface Media Sampling Direct Static Surface Measurements, Survey Unit 782-02

Sample Location	Date	Time	E600 Serial #	Probe Serial #	Instrument Operating Mode	Channel Selected	Background Compensation Mode	Recorded Value	Units	Instrument Efficiency	Instrument raw count rate (cpm)	Count Time (seconds)
IVP0000421	2/2/00	9:40:00	321	109	Scaler	Alpha	Gross	17.30	dpm/100cm ²	0.1949	3.4	90
IVP0000422	2/2/00	9:43:00	321	109	Scaler	Alpha	Gross	3.50	dpm/100cm ²	0.1949	0.7	90
IVP0000423	2/2/00	9:48:00	321	109	Scaler	Alpha	Gross	27.30	dpm/100cm ²	0.1949	5.3	90
IVP0000424	2/2/00	9:53:00	321	109	Scaler	Alpha	Gross	31.00	dpm/100cm ²	0.1949	6.0	90
IVP0000426	2/2/00	10:03:00	321	109	Scaler	Alpha	Gross	17.30	dpm/100cm ²	0.1949	3.4	90
IVP0000427	2/2/00	10:10:00	321	109	Scaler	Alpha	Gross	5.53	dpm/100cm ²	0.1949	1.1	90
IVP0000430	2/2/00	10:21:00	321	109	Scaler	Alpha	Gross	17.20	dpm/100cm ²	0.1949	3.4	90
IVP0000431	2/2/00	10:25:00	321	109	Scaler	Alpha	Gross	17.80	dpm/100cm ²	0.1949	3.5	90
IVP0000432	2/2/00	10:31:00	321	109	Scaler	Alpha	Gross	7.63	dpm/100cm ²	0.1949	1.5	90
IVP0000433	2/2/00	10:49:00	321	109	Scaler	Alpha	Gross	14.70	dpm/100cm ²	0.1949	2.9	90
IVP0000434	2/2/00	10:58:00	321	109	Scaler	Alpha	Gross	17.90	dpm/100cm ²	0.1949	3.5	90
IVP0000435	2/2/00	11:05:00	321	109	Scaler	Alpha	Gross	18.15	dpm/100cm ²	0.1949	3.5	90
IVP0000436	2/2/00	11:16:00	321	109	Scaler	Alpha	Gross	18.20	dpm/100cm ²	0.1949	3.5	90
IVP0000437	2/2/00	11:20:00	321	109	Scaler	Alpha	Gross	8.09	dpm/100cm ²	0.1949	1.6	90
IVP0000438	2/2/00	11:25:00	321	109	Scaler	Alpha	Gross	4.79	dpm/100cm ²	0.1949	0.9	90
IVP0000440	2/2/00	13:41:00	321	109	Scaler	Alpha	Gross	3.55	dpm/100cm ²	0.1949	0.7	90
IVP0000441	2/2/00	13:50:00	321	109	Scaler	Alpha	Gross	20.80	dpm/100cm ²	0.1949	4.1	90
IVP0000442	2/2/00	13:59:00	321	109	Scaler	Alpha	Gross	10.60	dpm/100cm ²	0.1949	2.1	90
IVP0000443	2/2/00	14:06:00	321	109	Scaler	Alpha	Gross	13.40	dpm/100cm ²	0.1949	2.6	90
IVP0000444	2/2/00	14:29:00	321	109	Scaler	Alpha	Gross	4.67	dpm/100cm ²	0.1949	0.9	90
IVP0000445	2/2/00	14:37:00	321	109	Scaler	Alpha	Gross	7.13	dpm/100cm ²	0.1949	1.4	90
IVP0000446	2/2/00	14:43:00	321	109	Scaler	Alpha	Gross	7.23	dpm/100cm ²	0.1949	1.4	90
IVP0000447	2/2/00	14:50:00	321	109	Scaler	Alpha	Gross	3.83	dpm/100cm ²	0.1949	0.7	90

Surface Media Sample Data, Survey Unit 782-02

Alpha Isotopic Analysis

Sample Location	Sample ID #	Lab Sample ID #	Sample Weight (grams)	Date Collected MM/DD/YY	Time Collected	Units	Am-241		Pu-238		Pu-239/240		U-234	U-235		U-238	Total Transuranic Activity	Total Uranium Activity
							Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	Reported Value	Reported Values w/samples < MDA at 0.5 MDA	Reported Value	dpn/100 cm ²	dpn/100 cm ²
IVP0000421	MED0000421	264888	10.48	01/27/00	12:45	dpn/100 cm ²	0.83	0.47	0.10	0.05	0.15	0.06	18.75	1.45	1.45	22.24	0.59	43.44
IVP0000422	MED0000422	264889	7.87	01/27/00	12:55	dpn/100 cm ²	0.90	0.45	0.06	0.04	0.48	0.24	13.79	1.18	1.18	14.73	0.73	29.70
IVP0000423	MED0000423	264890	10.61	01/27/00	13:00	dpn/100 cm ²	1.09	1.09	0.14	0.07	0.92	0.46	15.48	1.37	0.99	15.05	1.82	31.22
IVP0000424	MED0000424	264891	4.52	01/27/00	13:10	dpn/100 cm ²	1.33	1.33	0.07	0.04	2.15	2.15	6.74	0.81	0.41	3.41	3.52	10.56
IVP0000426	MED0000426	264892	2.82	01/27/00	13:20	dpn/100 cm ²	0.88	0.88	0.00	0.00	0.72	0.36	2.84	0.39	0.20	2.45	1.24	5.29
IVP0000427	MED0000427	264893	3.82	01/27/00	13:25	dpn/100 cm ²	1.08	1.08	0.12	0.06	1.30	1.30	2.31	0.12	0.12	2.23	2.44	4.66
IVP0000430	MED0000430	264894	4.49	01/27/00	13:30	dpn/100 cm ²	1.88	1.88	0.07	0.04	1.03	0.52	5.24	0.07	0.04	4.15	2.43	9.43
IVP0000431	MED0000431	264895	6.62	01/27/00	13:35	dpn/100 cm ²	1.75	1.75	0.06	0.04	3.00	3.00	7.10	0.99	0.05	7.40	4.79	14.55
IVP0000432	MED0000432	264896	8.24	01/27/00	13:45	dpn/100 cm ²	0.81	0.41	0.06	0.03	0.50	0.25	15.36	2.08	2.08	14.61	0.89	32.03
IVP0000433	MED0000433	264897	9.21	01/27/00	13:50	dpn/100 cm ²	1.23	1.23	0.17	0.09	0.04	0.02	15.59	0.88	0.34	19.37	1.34	35.30
IVP0000434	MED0000434	264898	8.15	01/27/00	13:55	dpn/100 cm ²	0.48	0.24	0.03	0.02	0.72	0.36	16.33	0.92	0.49	14.82	0.82	31.61
IVP0000435	MED0000435	264899	5.99	01/27/00	14:05	dpn/100 cm ²	0.06	0.03	0.06	0.03	0.17	0.09	15.43	0.86	0.86	15.49	0.14	31.80
IVP0000436	MED0000436	264900	11.24	01/27/00	14:10	dpn/100 cm ²	1.36	1.36	0.30	0.15	0.03	0.02	40.22	1.79	0.90	36.10	1.53	79.22
IVP0000437	MED0000437	264901	11.01	01/27/00	14:15	dpn/100 cm ²	0.59	0.30	0.16	0.10	0.83	0.83	19.45	1.24	0.82	21.32	1.22	41.39
IVP0000438	MED0000438	264902	7.97	01/27/00	14:20	dpn/100 cm ²	0.65	0.35	0.09	0.05	0.03	0.02	25.98	1.89	0.95	29.11	0.39	58.02
IVP0000440	MED0000440	264903	8.83	01/27/00	14:35	dpn/100 cm ²	0.69	0.69	0.19	0.10	0.06	0.04	10.17	0.41	0.21	10.25	0.83	20.63
IVP0000441	MED0000441	264904	6.75	01/27/00	14:45	dpn/100 cm ²	0.33	0.33	0.02	0.01	0.06	0.03	9.03	1.06	1.06	9.55	0.37	19.64
IVP0000442	MED0000442	264905	5.76	01/27/00	14:55	dpn/100 cm ²	0.43	0.43	0.44	0.22	0.37	0.19	6.36	0.30	0.15	6.09	0.84	12.80
IVP0000443	MED0000443	264906	8.97	01/27/00	15:05	dpn/100 cm ²	0.79	0.40	0.02	0.01	0.32	0.16	11.75	0.80	0.40	11.98	0.57	24.13
IVP0000444	MED0000444	264907	8.70	01/27/00	15:10	dpn/100 cm ²	1.31	1.31	0.11	0.09	0.39	0.20	10.76	0.38	0.19	11.93	1.56	22.88
IVP0000445	MED0000445	264908	8.84	01/27/00	15:15	dpn/100 cm ²	1.02	1.02	0.08	0.04	0.08	0.04	10.01	0.85	0.33	8.29	1.10	18.63
IVP0000446	MED0000446	264909	7.06	01/27/00	15:20	dpn/100 cm ²	0.57	0.29	0.02	0.01	0.04	0.02	7.61	0.87	0.44	8.64	0.32	16.69
IVP0000447	MED0000447	264910	10.25	01/27/00	15:25	dpn/100 cm ²	1.22	1.22	0.21	0.11	0.21	0.11	13.09	0.34	0.17	12.93	1.43	26.19

*Cross Reference Table for Blank and Spiked Samples for
Survey Units 727-01, 727-02, 782-01, and 782-02*

Sample Location	Sample Ticket Number (IVC)	Date Transferred	Smear Number
IVP0000261	259767	01/25/00	SMR0000261
IVP0000262	259760	01/25/00	SMR0000262
IVP0000263	259759	01/25/00	SMR0000263
IVP0000264	259730	01/25/00	SMR0000264
IVP0000265	259766	01/25/00	SMR0000265
IVP0000266	259762	01/25/00	SMR0000266
IVP0000451	259731	02/01/00	SMR0000451
IVP0000452	259732	02/01/00	SMR0000452
IVP0000453	259739	02/01/00	SMR0000453
IVP0000454	259735	02/01/00	SMR0000454
IVP0000455	259736	02/01/00	SMR0000455
IVP0000456	259737	02/01/00	SMR0000456

Data Set Sheet

SHP100 Property Number \$15564 Serial Number 109Eberline E600 Property Number \$15622 Serial Number 321

2.2 Calibration Source

Isotope/ Source	Source Serial No.	Certified Activity (dpm)	Observed Activity (dpm)	% Difference	Efficiency cpm/dpm	SOURCE GEOMETRY
Co-60 SA-90	CSC-604177	16,600	N/A	N/A	.3838	37 mm disc
Th-230 Pu-239	GM-785	1604 dpm/100cm ²	1684 dpm/ 100cm ²	4.99%	.1949	150cm ² PLANE

4.9 Record the alpha background count rate (< 5 cpm) 2.4 cpm4.12 Record the beta background count rate (< 600 cpm) 243 cpm

4.14 Record the beta efficiency (cpm/dpm) in the cell marked "4.14" in the right hand column of the above table.

4.18 Decrease in beta efficiency after 4 hours N/A % SEE NOTE #14.19 GEOMETRY - DETECTOR CENTERED OVER SOURCE, PROBE FACE @ $\approx 3/16$ "

5. Completion

Service Request No. N/A PASSED ☒ FAILED ☐(Reason) PROBE CALIBRATION FOR USE @ REETS, IVC SURVEYS6. ^{LIMITED} Calibration Sticker and IntervalNew Sticker Attached ☒ Due Date 6/30/2000

This calibration complies the requirements of ANSI 323-1978 and 10 CFR 835, and has been calibrated using standards whose accuracy is traceable to the National Institute of Standards and Technology.

Signature [Signature] Date 6/30/99

#1 THIS IS PERFORMED AS PART OF THE FIELD O.C. OF THE HP-100 PROBE WHERE RESPONSE CHECKS ARE PERFORMED FOR THE PROBES EVERY HOUR DURING FIELD USE. EXPERIENCE SHOWS THAT PROBE EFFICIENCY (α) DOES NOT DEGRADE MORE THAN 20% OVER THE 2 HOUR PERIOD A PROBE IS USED. SEE ATTACHED GRAPHS.

#2 PLATEAU GRAPH WAS NOT PRINTED OUT FOR THE RECORD SINCE NO PRINTER WAS AVAILABLE IN THE FIELD. THE SELECTED HIGH VOLTAGE (1572 VDC) RESULTED IN $< 1\% \beta \rightarrow \alpha$ CROSSOVER.

EBERLINE E-600 CALIBRATION REPORT

06/30/99 10:30:36

E-600 Serial Number	: 321
Program Version	: E600 V3.12
Calibration Date/Due Date	: 03/23/99 to 03/23/00
Scaler Precision	: 10%
Lower Threshold Slope	: 0.9524
Lower Threshold Intercept	: -0.1429 mV
Upper Threshold Slope	: 1.02
Upper Threshold Intercept	: -0.6074 mV
Alarm Editing	: Enabled
Latching Alarms	: Enabled
Auto Ranging	: Disabled
Beep on Auto-Range	: No
Ignore E-600 Cal. Date	: No
Ignore Probe Cal. Date	: No
Ratemeter Mode Support	: Enabled
Integrate Mode Support	: Enabled
Scaler Mode Support	: Enabled
Peak Hold Mode Support	: Enabled
Background Update Mode Support	: Enabled
Log ID Source	: Internal/Aux.
Star Key Ratemeter Function	: Zero Display
Star Key Integrate Function	: Zero Display
Scaler Display Units	: Rate
Scaler Counting Mode	: Fixed Time
Smart Probe Serial Number	: 109
Type	: HP-100
Calibration Date/Due Date	: 06/30/99 to 06/30/00
Dead Time	: 7.50 usec
Surface Area	: 100 cm ²
Max High Voltage	: 1900 Vdc
Overrange	: 80000 cps

Probe HP-100 109 continued...

Channel 1

Channel Type	: Alpha
Rate Units	: dpm/100cm2
Response Times	: 22,10,3 secs
High Voltage	: 1572 Vdc
Lower Threshold	: 1.00 mV
Upper Threshold	: 27.1 mV
Selected Window	: Upper
Upper Cal. Constant	: 0.1949 counts/disint.
Scaler Time	: 90 secs
Lower to Upper Crossover	: 0.0012
Upper to Lower Crossover	: 0.0838

Channel 2

Channel Type	: Beta
Rate Units	: dpm/100cm2
Response Times	: 22,10,3 secs
High Voltage	: 1572 Vdc
Lower Threshold	: 1.00 mV
Upper Threshold	: 27.1 mV
Selected Window	: Lower
Lower Cal. Constant	: 0.3838 counts/disint.
Scaler Time	: 90 secs
Lower to Upper Crossover	: 0.0012
Upper to Lower Crossover	: 0.0838

Channel 3

Channel Type	: Alpha/Beta
Rate Units	: dpm/100cm2
Response Times	: 22,10,3 secs
High Voltage	: 1572 Vdc
Lower Threshold	: 1.00 mV
Upper Threshold	: 27.1 mV
Selected Window	: Both
Lower Cal. Constant	: 0.3838 counts/disint.
Upper Cal. Constant	: 0.1949 counts/disint.
Scaler Time	: 90 secs
Lower to Upper Crossover	: 0.0012
Upper to Lower Crossover	: 0.0838

Cable Length: 60 inches

Signature: Jay W. Ruff

Date: 6/30/99

After-Calibration Source Response Check Data Sheet

Location Rock Flats 10C
 Month Aug Day 4 Year 1999

Detector/Probe Data (if applicable)

Manufacturer EBERLING
 Model No. E-600/W SHP-100 #109
 Government Property No. \$ 15564
 Calibration Due Date 6-30-00

Survey Instrument Data

Manufacturer EBERLING
 Model No. E-600
 Government Property No. \$ 15622
 Calibration Due Date 3-23-00

Check Source Data

Isotope Pu-239
 Source I.D. No. Gm-785

Instrument Scale	Source Detector Distance	Shielding/Geometry	Instrument Response	-20%	+20%	Scale Units
NA	2 1/8"	CONTACT w/ RUBBER FEET	1631	1305	1957	dpm/100cm ²

Comments:

A. SAMILJAN

Performed by (print)

[Signature]

Performed by (signature)

8/4/99

Date

J. LIVERY

Reviewed by (print)

[Signature]

Reviewed by (signature)

8/6/99

Date

This appendix contains the raw ASCII text file data download directly from the E-600 instrument's memories without modification, sorting, or data reduction of any kind. The data are actually contained in three separate ASCII files, one file corresponding to each date in which information was collected. One unique aspect of this data presentation is that the data is presented exactly in the chronological order in which it was collected in the field. This provides an electronic time stamp permitting verification that time criteria included in the field operating procedures associated with the IV SAP were met.

"Survey Location", "Log Date", "Log Time", "Probe S/N", "Log Mode", "Channel Type", "Reading", "Gross/Net", "Units", "E-600
S/N", "E-600 Address", "Stored Bkg", "Bkg Units", "Status"
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"RESP/CHECK", "01/25/00", "08:59:00", "109", "Scaler", "Alpha", "1.45E+03", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"RESP/CHECK", "01/25/00", "09:01:00", "109", "Scaler", "Alpha", "1.49E+03", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "09:06:00", "109", "Scaler", "Alpha", "1.51E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "09:08:00", "109", "Scaler", "Alpha", "8.45E+00", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "09:09:00", "109", "Scaler", "Alpha", "1.87E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000369", "01/25/00", "09:19:00", "109", "Scaler", "Alpha", "2.49E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000369", "01/25/00", "09:21:00", "109", "Scaler", "Alpha", "2.55E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000373", "01/25/00", "09:23:00", "109", "Scaler", "Alpha", "2.47E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000373", "01/25/00", "09:24:00", "109", "Scaler", "Alpha", "1.47E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000376", "01/25/00", "09:27:00", "109", "Scaler", "Alpha", "2.48E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000376", "01/25/00", "09:29:00", "109", "Scaler", "Alpha", "2.20E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000351", "01/25/00", "09:59:00", "109", "Scaler", "Alpha", "1.23E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000352", "01/25/00", "10:00:00", "109", "Scaler", "Alpha", "8.82E+00", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000353", "01/25/00", "10:02:00", "109", "Scaler", "Alpha", "2.15E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000354", "01/25/00", "10:04:00", "109", "Scaler", "Alpha", "2.01E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000355", "01/25/00", "10:06:00", "109", "Scaler", "Alpha", "1.57E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000356", "01/25/00", "10:08:00", "109", "Scaler", "Alpha", "1.58E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000356", "01/25/00", "10:14:00", "109", "Scaler", "Alpha", "1.87E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"RESP/CHECK", "01/25/00", "10:16:00", "109", "Scaler", "Alpha", "1.61E+03", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"RESP/CHECK", "01/25/00", "10:18:00", "109", "Scaler", "Alpha", "1.52E+03", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"RESP/CHECK", "01/25/00", "10:20:00", "109", "Scaler", "Alpha", "1.57E+03", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "10:21:00", "109", "Scaler", "Alpha", "1.49E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "10:23:00", "109", "Scaler", "Alpha", "1.56E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"BACKGROUND", "01/25/00", "10:25:00", "109", "Scaler", "Alpha", "2.25E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000357", "01/25/00", "10:27:00", "109", "Scaler", "Alpha", "2.19E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000358", "01/25/00", "10:29:00", "109", "Scaler", "Alpha", "2.05E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000359", "01/25/00", "10:32:00", "109", "Scaler", "Alpha", "2.11E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000360", "01/25/00", "10:34:00", "109", "Scaler", "Alpha", "2.06E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000361", "01/25/00", "10:37:00", "109", "Scaler", "Alpha", "1.24E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000362", "01/25/00", "10:39:00", "109", "Scaler", "Alpha", "2.20E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000362", "01/25/00", "10:40:00", "109", "Scaler", "Alpha", "2.27E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000363", "01/25/00", "10:43:00", "109", "Scaler", "Alpha", "1.94E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000364", "01/25/00", "10:44:00", "109", "Scaler", "Alpha", "1.34E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000365", "01/25/00", "10:46:00", "109", "Scaler", "Alpha", "2.99E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000366", "01/25/00", "10:48:00", "109", "Scaler", "Alpha", "1.91E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000367", "01/25/00", "10:52:00", "109", "Scaler", "Alpha", "2.20E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000367", "01/25/00", "10:54:00", "109", "Scaler", "Alpha", "2.00E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000368", "01/25/00", "10:56:00", "109", "Scaler", "Alpha", "1.54E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"
"IVP00000368", "01/25/00", "10:58:00", "109", "Scaler", "Alpha", "1.40E+01", "Gross", "dpm/100cm2", "321,0,0.0", "dpm/100cm2", "Normal"

"IVP0000368"	"01/25/00"	"11:00:00"	"1109"	"Scaler"	"Alpha"	1.51E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000370"	"01/25/00"	"11:04:00"	"1109"	"Scaler"	"Alpha"	1.89E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000370"	"01/25/00"	"11:05:00"	"1109"	"Scaler"	"Alpha"	1.63E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000371"	"01/25/00"	"11:07:00"	"1109"	"Scaler"	"Alpha"	3.63E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000371"	"01/25/00"	"11:09:00"	"1109"	"Scaler"	"Alpha"	2.95E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000372"	"01/25/00"	"11:12:00"	"1109"	"Scaler"	"Alpha"	2.94E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000372"	"01/25/00"	"11:14:00"	"1109"	"Scaler"	"Alpha"	1.57E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000374"	"01/25/00"	"11:16:00"	"1109"	"Scaler"	"Alpha"	1.58E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000374"	"01/25/00"	"11:18:00"	"1109"	"Scaler"	"Alpha"	1.58E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000374"	"01/25/00"	"11:22:00"	"1109"	"Scaler"	"Alpha"	2.26E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000375"	"01/25/00"	"11:24:00"	"1109"	"Scaler"	"Alpha"	1.58E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000375"	"01/25/00"	"11:26:00"	"1109"	"Scaler"	"Alpha"	9.03E+00	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000377"	"01/25/00"	"11:28:00"	"1109"	"Scaler"	"Alpha"	8.82E+00	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000377"	"01/25/00"	"11:29:00"	"1109"	"Scaler"	"Alpha"	8.80E+00	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000378"	"01/25/00"	"11:31:00"	"1109"	"Scaler"	"Alpha"	1.91E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000378"	"01/25/00"	"11:32:00"	"1109"	"Scaler"	"Alpha"	1.58E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000379"	"01/25/00"	"11:33:00"	"1109"	"Scaler"	"Alpha"	1.94E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000379"	"01/25/00"	"11:35:00"	"1109"	"Scaler"	"Alpha"	1.94E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"IVP0000379"	"01/25/00"	"11:37:00"	"1109"	"Scaler"	"Alpha"	1.23E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"RESP/CHECK"	"01/25/00"	"11:38:00"	"1109"	"Scaler"	"Alpha"	1.53E+03	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"RESP/CHECK"	"01/25/00"	"11:39:00"	"1109"	"Scaler"	"Alpha"	1.50E+03	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"RESP/CHECK"	"01/25/00"	"11:40:00"	"1109"	"Scaler"	"Alpha"	1.44E+03	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"BACKGROUND"	"01/25/00"	"11:42:00"	"1109"	"Scaler"	"Alpha"	1.23E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"BACKGROUND"	"01/25/00"	"11:44:00"	"1109"	"Scaler"	"Alpha"	1.03E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"
"BACKGROUND"	"01/25/00"	"11:45:00"	"1109"	"Scaler"	"Alpha"	1.51E+01	"Gross"	"dpm/100cm2"	321,0,0,0,	"dpm/100cm2"	"Normal"

S/N	E-600 Address	Stored Bkg	Bkg Units	Status							
"Survey Location"	"Log Date"	"Log Time"	"Probe S/N"	"Log Mode"	"Channel Type"	"Reading"	"Gross/Net"	"Units"	"E-600		
"RESP/CHECK"	"02/02/00"	"09:21:00"	"109"	"Scaler"	"Alpha"	1.50E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"09:23:00"	"109"	"Scaler"	"Alpha"	1.59E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"09:24:00"	"109"	"Scaler"	"Alpha"	1.45E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"09:29:00"	"109"	"Scaler"	"Alpha"	4.62E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"09:31:00"	"109"	"Scaler"	"Alpha"	1.47E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"09:33:00"	"109"	"Scaler"	"Alpha"	7.95E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000421"	"02/02/00"	"09:37:00"	"109"	"Scaler"	"Alpha"	1.04E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000421"	"02/02/00"	"09:40:00"	"109"	"Scaler"	"Alpha"	1.73E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000422"	"02/02/00"	"09:41:00"	"109"	"Scaler"	"Alpha"	2.41E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000422"	"02/02/00"	"09:43:00"	"109"	"Scaler"	"Alpha"	3.50E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000423"	"02/02/00"	"09:45:00"	"109"	"Scaler"	"Alpha"	2.06E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000423"	"02/02/00"	"09:48:00"	"109"	"Scaler"	"Alpha"	2.73E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000424"	"02/02/00"	"09:51:00"	"109"	"Scaler"	"Alpha"	6.94E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000424"	"02/02/00"	"09:53:00"	"109"	"Scaler"	"Alpha"	3.10E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000425"	"02/02/00"	"09:57:00"	"109"	"Scaler"	"Alpha"	1.75E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000426"	"02/02/00"	"10:00:00"	"109"	"Scaler"	"Alpha"	1.40E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000426"	"02/02/00"	"10:03:00"	"109"	"Scaler"	"Alpha"	1.73E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000426"	"02/02/00"	"10:04:00"	"109"	"Scaler"	"Alpha"	1.40E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000427"	"02/02/00"	"10:08:00"	"109"	"Scaler"	"Alpha"	3.96E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000427"	"02/02/00"	"10:10:00"	"109"	"Scaler"	"Alpha"	3.80E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000427"	"02/02/00"	"10:11:00"	"109"	"Scaler"	"Alpha"	7.26E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000428"	"02/02/00"	"10:14:00"	"109"	"Scaler"	"Alpha"	7.26E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000429"	"02/02/00"	"10:16:00"	"109"	"Scaler"	"Alpha"	7.15E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000430"	"02/02/00"	"10:19:00"	"109"	"Scaler"	"Alpha"	7.23E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000430"	"02/02/00"	"10:21:00"	"109"	"Scaler"	"Alpha"	1.72E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000431"	"02/02/00"	"10:23:00"	"109"	"Scaler"	"Alpha"	1.11E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000431"	"02/02/00"	"10:25:00"	"109"	"Scaler"	"Alpha"	1.78E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000432"	"02/02/00"	"10:27:00"	"109"	"Scaler"	"Alpha"	1.12E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000432"	"02/02/00"	"10:29:00"	"109"	"Scaler"	"Alpha"	7.69E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
IVP0000432"	"02/02/00"	"10:31:00"	"109"	"Scaler"	"Alpha"	7.63E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
RESP/CHECK"	"02/02/00"	"10:34:00"	"109"	"Scaler"	"Alpha"	1.41E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
RESP/CHECK"	"02/02/00"	"10:35:00"	"109"	"Scaler"	"Alpha"	1.45E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
RESP/CHECK"	"02/02/00"	"10:39:00"	"109"	"Scaler"	"Alpha"	1.36E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
BACKGROUND"	"02/02/00"	"10:42:00"									

"IVP0000435"	"02/02/00"	"11:01:00"	"109"	"Scaler"	"Alpha"	"2.15E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000435"	"02/02/00"	"11:05:00"	"109"	"Scaler"	"Alpha"	"2.15E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000435"	"02/02/00"	"11:08:00"	"109"	"Scaler"	"Alpha"	"1.48E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000436"	"02/02/00"	"11:14:00"	"109"	"Scaler"	"Alpha"	"1.83E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000436"	"02/02/00"	"11:16:00"	"109"	"Scaler"	"Alpha"	"1.82E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000437"	"02/02/00"	"11:18:00"	"109"	"Scaler"	"Alpha"	"1.50E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000437"	"02/02/00"	"11:20:00"	"109"	"Scaler"	"Alpha"	"8.09E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000438"	"02/02/00"	"11:22:00"	"109"	"Scaler"	"Alpha"	"1.83E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000438"	"02/02/00"	"11:24:00"	"109"	"Scaler"	"Alpha"	"1.84E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000438"	"02/02/00"	"11:25:00"	"109"	"Scaler"	"Alpha"	"4.79E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000439"	"02/02/00"	"11:28:00"	"109"	"Scaler"	"Alpha"	"1.20E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"11:33:00"	"109"	"Scaler"	"Alpha"	"1.50E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"11:35:00"	"109"	"Scaler"	"Alpha"	"1.50E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"11:36:00"	"109"	"Scaler"	"Alpha"	"1.55E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"11:39:00"	"109"	"Scaler"	"Alpha"	"1.43E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"11:40:00"	"109"	"Scaler"	"Alpha"	"7.67E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"11:42:00"	"109"	"Scaler"	"Alpha"	"2.81E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"13:19:00"	"109"	"Scaler"	"Alpha"	"7.87E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"13:21:00"	"109"	"Scaler"	"Alpha"	"8.14E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"BACKGROUND"	"02/02/00"	"13:22:00"	"109"	"Scaler"	"Alpha"	"4.61E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"13:24:00"	"109"	"Scaler"	"Alpha"	"1.55E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"13:28:00"	"109"	"Scaler"	"Alpha"	"1.68E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"RESP/CHECK"	"02/02/00"	"13:30:00"	"109"	"Scaler"	"Alpha"	"1.51E+03"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000440"	"02/02/00"	"13:38:00"	"109"	"Scaler"	"Alpha"	"1.05E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000440"	"02/02/00"	"13:41:00"	"109"	"Scaler"	"Alpha"	"3.55E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000441"	"02/02/00"	"13:47:00"	"109"	"Scaler"	"Alpha"	"3.55E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000441"	"02/02/00"	"13:50:00"	"109"	"Scaler"	"Alpha"	"2.08E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000442"	"02/02/00"	"13:56:00"	"109"	"Scaler"	"Alpha"	"3.44E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000442"	"02/02/00"	"13:59:00"	"109"	"Scaler"	"Alpha"	"1.06E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000443"	"02/02/00"	"14:03:00"	"109"	"Scaler"	"Alpha"	"1.74E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000443"	"02/02/00"	"14:06:00"	"109"	"Scaler"	"Alpha"	"1.34E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000444"	"02/02/00"	"14:10:00"	"109"	"Scaler"	"Alpha"	"2.07E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000444"	"02/02/00"	"14:14:00"	"109"	"Scaler"	"Alpha"	"1.74E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000444"	"02/02/00"	"14:29:00"	"109"	"Scaler"	"Alpha"	"4.67E+00"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000445"	"02/02/00"	"14:35:00"	"109"	"Scaler"	"Alpha"	"2.10E+01"	"Gross"	"dpm/100cm2"	"321,0,52.2"	"Normal"
"IVP0000445"	"02/02/00"	"14:37:00"	"109"</							

"BACKGROUND"	"02/02/00"	"15:00:00"	"109"	"Scaler"	"Alpha"	1.15E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"15:01:00"	"109"	"Scaler"	"Alpha"	8.32E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"15:03:00"	"109"	"Scaler"	"Alpha"	4.94E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:05:00"	"109"	"Scaler"	"Alpha"	1.40E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:07:00"	"109"	"Scaler"	"Alpha"	1.35E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:09:00"	"109"	"Scaler"	"Alpha"	1.41E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"15:30:00"	"109"	"Scaler"	"Alpha"	7.93E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"15:32:00"	"109"	"Scaler"	"Alpha"	1.13E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"BACKGROUND"	"02/02/00"	"15:34:00"	"109"	"Scaler"	"Alpha"	7.75E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:36:00"	"109"	"Scaler"	"Alpha"	1.58E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:38:00"	"109"	"Scaler"	"Alpha"	1.58E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"RESP/CHECK"	"02/02/00"	"15:41:00"	"109"	"Scaler"	"Alpha"	1.56E+03	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000396"	"02/02/00"	"15:50:00"	"109"	"Scaler"	"Alpha"	1.44E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000396"	"02/02/00"	"15:52:00"	"109"	"Scaler"	"Alpha"	7.57E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000397"	"02/02/00"	"15:54:00"	"109"	"Scaler"	"Alpha"	1.11E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000397"	"02/02/00"	"15:56:00"	"109"	"Scaler"	"Alpha"	4.33E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000398"	"02/02/00"	"15:58:00"	"109"	"Scaler"	"Alpha"	4.49E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000398"	"02/02/00"	"16:01:00"	"109"	"Scaler"	"Alpha"	1.80E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000399"	"02/02/00"	"16:03:00"	"109"	"Scaler"	"Alpha"	2.47E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000399"	"02/02/00"	"16:06:00"	"109"	"Scaler"	"Alpha"	4.16E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000400"	"02/02/00"	"16:09:00"	"109"	"Scaler"	"Alpha"	3.69E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000400"	"02/02/00"	"16:11:00"	"109"	"Scaler"	"Alpha"	1.42E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000401"	"02/02/00"	"16:13:00"	"109"	"Scaler"	"Alpha"	7.31E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000401"	"02/02/00"	"16:15:00"	"109"	"Scaler"	"Alpha"	7.19E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000401"	"02/02/00"	"16:18:00"	"109"	"Scaler"	"Alpha"	1.76E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000402"	"02/02/00"	"16:20:00"	"109"	"Scaler"	"Alpha"	7.50E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000402"	"02/02/00"	"16:22:00"	"109"	"Scaler"	"Alpha"	2.49E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000403"	"02/02/00"	"16:24:00"	"109"	"Scaler"	"Alpha"	3.14E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000403"	"02/02/00"	"16:26:00"	"109"	"Scaler"	"Alpha"	8.80E+00	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000404"	"02/02/00"	"16:28:00"	"109"	"Scaler"	"Alpha"	1.07E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000404"	"02/02/00"	"16:29:00"	"109"	"Scaler"	"Alpha"	1.58E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000405"	"02/02/00"	"16:31:00"	"109"	"Scaler"	"Alpha"	1.46E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000405"	"02/02/00"	"16:32:00"	"109"	"Scaler"	"Alpha"	1.23E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000406"	"02/02/00"	"16:34:00"	"109"	"Scaler"	"Alpha"	1.46E+01	"Gross"	"dpm/100cm2"	321,0	52.2	"Normal"
"IVP0000406"	"02/02/00"										

"BACKGROUND", "02/02/00", "16:52:00", "109", "Scaler", "Alpha", 8.24E+00, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"
"BACKGROUND", "02/02/00", "16:54:00", "109", "Scaler", "Alpha", 8.32E+00, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"
"BACKGROUND", "02/02/00", "16:56:00", "109", "Scaler", "Alpha", 4.76E+00, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"
"RESP/CHECK", "02/02/00", "16:58:00", "109", "Scaler", "Alpha", 1.41E+03, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"
"RESP/CHECK", "02/02/00", "16:59:00", "109", "Scaler", "Alpha", 1.57E+03, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"
"RESP/CHECK", "02/02/00", "17:01:00", "109", "Scaler", "Alpha", 1.42E+03, "Gross", "dpm/100cm2", 321, 0, 52.2, "dpm/100cm2", "Normal"

"Survey Location", "Log Date", "Log Time", "Probe S/N", "Log Mode", "Channel Type", "Reading", "Gross/Net", "Units", "E-600 S/N", "E-600 Address", "Stored Bkg", "Bkg Units", "Status"

"BACKGROUND", "02/03/00", "08:45:00", "109", "Scaler", "Alpha", "4.76E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"BACKGROUND", "02/03/00", "08:47:00", "109", "Scaler", "Alpha", "4.46E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"BACKGROUND", "02/03/00", "08:49:00", "109", "Scaler", "Alpha", "4.42E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "08:51:00", "109", "Scaler", "Alpha", "1.45E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "08:52:00", "109", "Scaler", "Alpha", "1.53E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "08:54:00", "109", "Scaler", "Alpha", "1.69E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000381", "02/03/00", "09:02:00", "109", "Scaler", "Alpha", "8.94E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000382", "02/03/00", "09:06:00", "109", "Scaler", "Alpha", "2.04E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000383", "02/03/00", "09:10:00", "109", "Scaler", "Alpha", "5.46E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000384", "02/03/00", "09:12:00", "109", "Scaler", "Alpha", "5.05E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000385", "02/03/00", "09:14:00", "109", "Scaler", "Alpha", "1.85E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000386", "02/03/00", "09:16:00", "109", "Scaler", "Alpha", "1.14E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000386", "02/03/00", "09:18:00", "109", "Scaler", "Alpha", "1.74E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000386", "02/03/00", "09:19:00", "109", "Scaler", "Alpha", "7.40E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000387", "02/03/00", "09:21:00", "109", "Scaler", "Alpha", "2.09E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000387", "02/03/00", "09:23:00", "109", "Scaler", "Alpha", "2.08E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000388", "02/03/00", "09:26:00", "109", "Scaler", "Alpha", "2.03E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000389", "02/03/00", "09:28:00", "109", "Scaler", "Alpha", "1.84E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000390", "02/03/00", "09:30:00", "109", "Scaler", "Alpha", "1.77E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000390", "02/03/00", "09:32:00", "109", "Scaler", "Alpha", "1.76E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000391", "02/03/00", "09:34:00", "109", "Scaler", "Alpha", "1.90E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000392", "02/03/00", "09:37:00", "109", "Scaler", "Alpha", "8.94E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000392", "02/03/00", "09:39:00", "109", "Scaler", "Alpha", "8.96E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000393", "02/03/00", "09:41:00", "109", "Scaler", "Alpha", "8.87E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000394", "02/03/00", "09:42:00", "109", "Scaler", "Alpha", "2.02E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000395", "02/03/00", "09:46:00", "109", "Scaler", "Alpha", "1.91E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"BACKGROUND", "02/03/00", "09:50:00", "109", "Scaler", "Alpha", "4.73E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"BACKGROUND", "02/03/00", "09:52:00", "109", "Scaler", "Alpha", "4.99E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"BACKGROUND", "02/03/00", "09:54:00", "109", "Scaler", "Alpha", "7.56E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "09:58:00", "109", "Scaler", "Alpha", "1.50E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "10:00:00", "109", "Scaler", "Alpha", "1.44E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "10:07:00", "109", "Scaler", "Alpha", "1.47E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

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"BACKGROUND", "02/03/00", "10:35:00", "109", "Scaler", "Alpha", "4.80E+00", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "10:37:00", "109", "Scaler", "Alpha", "1.57E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "10:39:00", "109", "Scaler", "Alpha", "1.56E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"RESP/CHECK", "02/03/00", "10:41:00", "109", "Scaler", "Alpha", "1.55E+03", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000301", "02/03/00", "10:55:00", "109", "Scaler", "Alpha", "3.45E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000301", "02/03/00", "10:57:00", "109", "Scaler", "Alpha", "2.76E+01", "Gross", "dpm/100cm2", "321,0,52.2", "dpm/100cm2", "Normal"

"IVP0000302"	"02/03/00"	"10:59:00"	"109"	"Scaler"	"Alpha"	"3.11E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000302"	"02/03/00"	"11:00:00"	"109"	"Scaler"	"Alpha"	"2.40E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000303"	"02/03/00"	"11:02:00"	"109"	"Scaler"	"Alpha"	"1.38E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000303"	"02/03/00"	"11:04:00"	"109"	"Scaler"	"Alpha"	"2.07E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000304"	"02/03/00"	"11:06:00"	"109"	"Scaler"	"Alpha"	"2.41E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000304"	"02/03/00"	"11:07:00"	"109"	"Scaler"	"Alpha"	"4.13E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000305"	"02/03/00"	"11:09:00"	"109"	"Scaler"	"Alpha"	"1.75E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000305"	"02/03/00"	"11:11:00"	"109"	"Scaler"	"Alpha"	"1.39E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000306"	"02/03/00"	"11:12:00"	"109"	"Scaler"	"Alpha"	"1.06E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000306"	"02/03/00"	"11:14:00"	"109"	"Scaler"	"Alpha"	"2.09E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000306"	"02/03/00"	"11:16:00"	"109"	"Scaler"	"Alpha"	"2.42E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000307"	"02/03/00"	"11:17:00"	"109"	"Scaler"	"Alpha"	"2.43E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000307"	"02/03/00"	"11:19:00"	"109"	"Scaler"	"Alpha"	"2.41E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000308"	"02/03/00"	"11:21:00"	"109"	"Scaler"	"Alpha"	"4.19E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000308"	"02/03/00"	"11:23:00"	"109"	"Scaler"	"Alpha"	"1.41E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000309"	"02/03/00"	"11:25:00"	"109"	"Scaler"	"Alpha"	"2.09E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000309"	"02/03/00"	"11:27:00"	"109"	"Scaler"	"Alpha"	"7.36E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000310"	"02/03/00"	"11:28:00"	"109"	"Scaler"	"Alpha"	"1.75E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000310"	"02/03/00"	"11:30:00"	"109"	"Scaler"	"Alpha"	"1.09E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000311"	"02/03/00"	"11:32:00"	"109"	"Scaler"	"Alpha"	"2.11E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000311"	"02/03/00"	"11:33:00"	"109"	"Scaler"	"Alpha"	"1.11E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000312"	"02/03/00"	"11:36:00"	"109"	"Scaler"	"Alpha"	"1.08E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000312"	"02/03/00"	"11:38:00"	"109"	"Scaler"	"Alpha"	"2.13E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000312"	"02/03/00"	"11:39:00"	"109"	"Scaler"	"Alpha"	"4.84E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"11:41:00"	"109"	"Scaler"	"Alpha"	"4.70E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"11:43:00"	"109"	"Scaler"	"Alpha"	"4.61E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"11:45:00"	"109"	"Scaler"	"Alpha"	"1.39E+03"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"RESP/CHECK"	"02/03/00"	"11:46:00"	"109"	"Scaler"	"Alpha"	"1.53E+03"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"RESP/CHECK"	"02/03/00"	"11:48:00"	"109"	"Scaler"	"Alpha"	"1.49E+03"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"RESP/CHECK"	"02/03/00"	"11:50:00"	"109"	"Scaler"	"Alpha"	"1.19E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"12:45:00"	"109"	"Scaler"	"Alpha"	"1.47E+01"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"12:47:00"	"109"	"Scaler"	"Alpha"	"7.93E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"BACKGROUND"	"02/03/00"	"12:48:00"	"109"	"Scaler"	"Alpha"	"1.57E+03"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"RESP/CHECK"	"02/03/00"	"12:50:00"	"109"	"Scaler"	"Alpha"	"1.67E+03"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"RESP/CHECK"	"02/03/00"	"12:52:00"	"109"	"Scaler"	"Alpha"	"7.08E+00"	"Gross"	"dpm/100cm2"	321,0,52.2	"Normal"
"IVP0000313"	"02/03/00"	"12:56:00"								

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